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ABSTRACT

The National School-to-Work Office in collaboration with the National Association for Gifted Children, the Council for Exceptional Children, the Association for the Gifted, and the Council of State Directors of Programs for the Gifted have identified 11 gifted education/school-to-work (GT/STW) models that are either best practices or unique approaches. This information packet provides an overview of one of the best practices models: the School within a Workplace program in Florida. This program connects science teachers and gifted elementary and secondary with working scientists. The initiative was developed by the St. Lucie County School-to-Career partnership involving Harbor Branch Oceanographic Institution (HBOI) and Lincoln Park Academy, an academic magnet school for students grades 6-12 and site of the county's International Baccalaureate (IB) program adopted as a curriculum for gifted and talented high school students. The program features a pioneering pre-college marine science academy for juniors and seniors. Teachers and students spend 4-5 hours on alternating days at HBOI in a fast paced, rigorous research environment applying technologies that are integrated with the IB curriculum. Students conduct experiments, collect data for scientists, participate in internships, and complete essays. The information packet includes a program description, brochure, materials, and an application. (CR)

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EC 308139

Gifted Education/School-to-Work Models: Best Practices and Unique Approaches

The National School-to-Work Office has been collaborating with the National Association for Gifted Children, The Council for Exceptional Children, The Association for the Gifted, and the Council of State Directors of Programs for the Gifted on a national effort to identify exemplary Gifted Education/School-to-Work (STW) models. Our purpose has been to forge new relationships between the STW and gifted education communities around common and critical goals: teaching rigorous and relevant academic skills, identifying and developing talent, and guiding career development. We believe sharing these practices will expand learning opportunities for all learners by building an even richer and more inclusive STW system, and by "raising the bar" on learning and teaching for all students.

We use the term "gifted and talented," which is broader than "academically talented" (used in the School-to-Work Opportunities Act), because state definitions of giftedness mostly use some variation of the current federal definition, which is (1988 Jacob K. Javits Gifted and Talented Students Education Act):

> *Children and youth who give evidence of high performance capability in areas such as intellectual, creative, artistic or leadership capacity, or in specific academic fields, and who require services or activities not ordinarily provided by the school in order to fully develop such capabilities.*

Last year, letters were sent to state-level STW and gifted education directors and association leaders to help identify gifted education models that also exemplify STW. Submissions were also requested on all gifted education Listservs. We received 23 competitive submissions.

A technical review process was used to ensure that all submissions were thoroughly and impartially evaluated. An outside review panel was assembled which comprised experts in gifted education and STW. Their experience included state gifted education and STW leadership, local STW program evaluation, and post-secondary gifted education research. All submissions were evaluated according to criteria consistent with guidelines made available to all applicants.

Five **Best Practices** and six **Unique Approaches** were selected by the panel. The designation "Best Gifted Education/STW Practice" signifies excellent progress in implementing a comprehensive STW system that challenges high achieving/gifted and talented students. The designation "Unique Gifted Education/STW Approach" recognizes a unique program element. Unique Approaches did not present all key components of a comprehensive STW system (school-based, work-based, and connecting activities), or provide sufficient information about how gifted and talented students are served.

Programs evaluated as very strong:

- specifically serve gifted and talented students;
- demonstrate a school-based learning component that supports and builds on a work-based learning component, and provide students with high level academic and technical skills and opportunities for career exploration and guidance;

• demonstrate a work-based learning component connected to academic classroom learning, and prepare students for the diverse skills needed in today's high-performance workplaces;

• present connecting activities that build and maintain linkages between students, educators, the workplace, parents, and others in the community;

• provide evidence about effectiveness, including indicators that it could be replicated in diverse settings throughout the country; and

• address identified priorities such as strategies to: improve math and science achievement, serve gifted students in rural and urban areas, enhance middle school achievement, and promote linkages with institutions of higher learning.

The following is a brief description of one of the five **Best Practices** selected:

LINCOLN PARK ACADEMY–HARBOR BRANCH OCEANOGRAPHIC INSTITUTION, INC.—A SCHOOL WITHIN A WORKPLACE (FLORIDA): This advanced and innovative science education and technology model connects science teachers and gifted students with working scientists, from elementary to high school. This initiative was developed by the St. Lucie County School-to-Career partnership involving Harbor Branch Oceanographic Institution (HBOI) and Lincoln Park Academy (LPA), an academic magnet school (grades 6-12) and site of the county's International Baccalaureate (IB) program adopted as a curriculum for gifted and talented high school students. It features a pioneering pre-college marine science academy for juniors and seniors. Teachers and students spend 4-5 hours on alternating days at HBOI in a fast paced, rigorous research environment applying technologies that are integrated with the IB curriculum.

HBOI scientists from fields such as aquaculture, ocean engineering, biomedical marine research, and environmental chemistry mentor students and train teachers, advising on curriculum and laboratory exercises. Science and math are taught at the state-of-the art J. Seward Johnson Marine Education and Conference Center. Students conduct experiments, collect data for scientists, participate in summer internships, and complete a 4,000-word essay and portfolio of laboratory experiences for the IB diploma. Intensive science fair summer camps are held for entering 9th graders, and field and laboratory activities engage middle school students. Seniors design marine science activities for students from nearby Lakewood Park Elementary School.

Students interested in the highly competitive IB program apply during 8th grade. Twenty-five percent of the 125 IB students in the first two years of the program are non-Caucasian, and a majority have been girls. This initiative has received awards from the National Science Foundation, Florida STW, and the Florida Department of Education.

CONTACT INFORMATION

Program information: Dr. Susan B. Cook, Education Director, HBOI, 5600 U. S. 1 North, Fort Pierce, FL 34946, (561) 465-2400, x. 502, scook@hboi.edu.

Dr. Mary Lou Goldberg, Principal, LPA, 1806 Avenue I, Fort Pierce, FL 34950.

Ms. Mary Gregory, Science Curriculum Specialist, St. Lucie County School District; liaison to satellite programs including the Smithsonian's Marine Field Station, 2909 Delaware Avenue, Ft. Pierce, FL 34947.

Lincoln Park Academy

A Traditional Academic School

1806 Avenue I
Fort Pierce, Florida 34950
(561) 468-5474

Principal
Dr. Mary Lou Goldberg

Assistant Principals
Jimmie Johnson
Barbara Horton
Kimberlee Cooper

May 13, 1998

Ms. Lorraine Kleinwaks
National School-To-Work Office
400 Virginia Avenue, SW Suite 210
Washington, DC 20024

Dear Ms. Kleinwaks:

Re: Gifted Education/STW Symposium Project

As per your request, Lincoln Park Academy is submitting the following information regarding our exemplary gifted education program as it relates to the STW initiative.

The staffs of Lincoln Park Academy (LPA) and Harbor Branch Oceanographic Institution, Inc. (HBOI) have forged a collaborative business partnership to explore challenging and innovative methods to connect the high school science classroom to the real world of working scientists. Efforts have focused on preparing our International Baccalaureate (gifted) students for real careers as competent and effective workers by making education more relevant. Specifics of the project include a school within a workplace. A new academy called LPA/Harborside has been developed, implemented and housed on the Harbor Branch campus as a satellite of Lincoln Park Academy. Working scientists from diverse fields of research science serve as consultants to train teachers, advise on curriculum, lecture students, and design lab exercises and projects. Students, teachers, and scientists are all a part of both the LPA and HBOI educational efforts. Students have experienced a wealth of benefits derived from this project including the use of millions of dollars worth of equipment, a sense of purpose along with opportunities for recognition, interaction with graduate student assistants, exposure to a variety of occupations and mentors, exciting learning environments, and library research capabilities. Teachers have experienced direct benefits including consultants on hand, research library with hundreds of journals, assistance in designing labs, access to the latest technology, auditorium for guest lectures, and support of graduate student assistants. This project is a substantial departure from current school practice. Once students became comfortable with the equipment, laboratories, and techniques, they have been expected to conduct specific real world projects.

HBOI continues to assist students in exploring career options through one-on-one mentoring. Many students in this program have chosen marine science as their path of study and one student has decided to go into business based on the experience and guidance she has received through aquaculture. HBOI is on our curriculum committee and assists in the

establishment of curriculum that adheres to the strict IB program. In addition, HBOI assists the students in linking school activities (science fair projects) with activities in the workplace. Teacher internships have been established to expose teachers to skills needed in today's business environment.

The staff of HBOI assumes the role of mentors on a daily basis and provides job-shadowing opportunities to all participating students. In addition, they provide apprenticeships through the development of their summer intern program. Group and individual projects are structured as a planned program of training for students with attention given to include individualized learning plans. Furthermore, the HBOI staff has been assisting students by providing the development skills necessary for job interviewing and job searching. Staff members communicate with the students outside the classroom arena on both a personal and professional level and have provided letters of recommendation to colleges on the students' behalf.

HBOI staff has provided assistance to STW participants in finding jobs and/or continuing their education as mentioned above. Grants have been written to provide transportation for all students involved in the program and have provided scholarships for summer camps alleviating any financial burdens participates might encounter. In addition, they have underwritten costs of school initiatives through innovative grants that include "NSF Grant for Women & Girls in Science" ($99,000), and are in the process of applying for a Business Challenge grant for the continuation of Harborside. As a final note, 60% of the costs incurred at Harborside has been underwritten by HBOI.

Sincerely,

Dr. Mary Lou Goldberg, Principal

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Marine Science is a very broad and diverse occupational area that encompasses many different disciplines and employs a diversity of people at a variety of levels. The main "service" is to increase knowledge of the oceans and improve man's ability to protect and utilize these resources. This brochure has been prepared to give visitors and students an overview of career/jobs available at our institution. Employment patterns at other oceanographic organizations are likely to be similar.

What to do to prepare

- Take as many science and math courses as you can in high school and college. Good grades are helpful but the most important thing is to pass the courses and learn fundamental concepts.
- In college, major in a basic science (biology, chemistry, physics, earth science). Take marine science courses if they are offered at your school or in a summer program, but do not worry about majoring in marine science, marine biology, or oceanography.
- Think about yourself - your talents, likes and dislikes. Do you like to work outdoors or indoors? With small or large organisms/pieces of equipment? With people or alone?
- Get practical, "hands-on" experience to find out if you like the work. Volunteer or apply for paid internship positions at HBOI and other similar laboratories.

For More Information about Marine Science

Careers in Oceanography and Marine-Related Fields. For an overview of careers and jobs, visit the web site www.onr.navy.mil from The Oceanography Society, 4052 Timber Ridge Drive, Virginia Beach, VA 23455. (804) 464-0131.

Marine Science Careers, A Sea Grant Guide to Ocean Opportunities.
40 page booklet with valuable career opportunities. Single copies (nominal fee) from the Sea Grant Communications Office at the University of New Hampshire, Kingman Farm/UNH, Durham, NH 03824-3512 (checks payable to UNH).

Education and Training Programs in Oceanography and Related Fields. Detailed description of post secondary training and academic programs. Mostly graduate level and above but some technical programs. Marine Technology Society, 1828 L Street, NW, Suite 906, Washington, DC 20036. (202) 775-5966. $6 for handling cost.

Careers in Marine Science: Adversity of Opportunities. Video sponsored by the National Association of Marine Laboratories and produced by Harbor Branch Oceanographic Institution. Available at HBOI education office $12.95.

Marine Science Careers at HBOI

HARBOR BRANCH OCEANOGRAPHIC INSTITUTION

J. Seward Johnson Marine Education and Conference Center
Harbor Branch Oceanographic Institution (HBOI)
5600 U.S. 1 North
Ft. Pierce, FL 34946
Phone: 561-465-2400, ext. 500
FAX: 561-465-5743
email: education@hboi.edu
website: www.hboi.edu

Careers in Marine Science

Associate and Senior Scientists; Engineers: Scientific entrepreneurs who design and supervise projects that advance knowledge and develop new technologies. HBOI staff at this level must obtain grants and contracts to fund work. University faculty at this level teach undergraduate and graduate students and conduct grant and contract funded research. In science, scientists and faculty need a Ph.D. In Engineering, a Masters is usually required. Salaries range from 30K to 100K and above depending on locality and area of expertise.

Assistant Scientists/Engineers and Postdoctoral Fellows: Assistant Scientists and Engineers are beginning professionals with salaries from 20-50K. Many people complete postdoctoral fellowships to broaden expertise after Ph.D. HBOI postdocs receive a yearly stipend of 27K, assistance with group health insurance and some travel and supply funds.

Technical Staff: Day to day performance of scientific studies and technology design and development. Electronics experts; computer services; licensed vessel operators and scientific librarians. Research assistants with backgrounds in biology, chemistry, physics and geology work in both laboratory and field situations. Requirements for entry level positions vary from high school, community college and trade school programs (aquaculture and marine ops) to BS degrees (biology and physical oceanography). Salary range: 18-50K.

Institutional Management: Administrators who direct and supervise overall operations of research laboratories, engineering and consulting firms, and technical support sections at academic institutions (colleges, schools, universities). BS degrees in business, management, accounting, and computer systems engineering. Salary range: 30-100K and above depending on locality and area of expertise.

Support Staff: Facilities and grounds maintenance and operation. Hotel type positions (student and visiting scientist housing). Accounting and Grant administration. Secretarial and Administrative office support for scientists, engineers and institutional managers. Small boat repair, maintenance and operation. High school and trade/ business school training. Salary range: 12-30K.

Work environment and conditions: Stimulating and challenging work with modern equipment, instrumentation and facilities. Pleasant seaside surroundings. Support staff work 40 hour weeks; administrators, scientific, and technology development specialists work hours required to do the job. Travel opportunities often very good.

Outlook for employment: At a research lab like HBOI manpower needs depend heavily on the research funding climate so there is some built in uncertainty. University and college faculty and staff have more security (tenure for faculty; civil service tracks for staff). Opportunities greater in fields with a physical science focus and in interdisciplinary areas. Opportunities in these areas should grow (10% increase over 3-5 years).

For a closer look:

Tours of HBOI from the Visitors Center at 10:00 am, noon and 2:00 pm daily excluding some holidays.

Applications forms for college level courses and internships available at the Education Center office.

Volunteer opportunities may from time to time be available at the high school level; these are typically in aquaculture or the reference specimen museum.

A sampling of disciplines

- MARINE BIOLOGY
- AQUACULTURE AND AQUACULTURE TECHNOLOGIES
- OCEAN ENGINEERING
- OPERATION OF OCEANOGRAPHIC FLEET
- MARINE CHEMISTRY
- MARINE GEOLOGY
- PHYSICAL OCEANOGRAPHY
- ENVIRONMENTAL ANALYSIS AND TESTING
- MARINE EDUCATION
- MARINE POLICY

HBOI is the Florida regional partner of the MATE (Marine Advanced Technology Education Center) in Monterey, California. The MATE website *www.marinetech.org* contains a wealth of information on career opportunities in marine-related technical fields.

LPA-Harborside, a School within a Workplace

A Model for Establishing Effective Links with Professional Scientists in a School to Work Setting

Submission to the National STW office

Prepared by Dr. Susan B. Cook, Director

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May 14, 1998

Overview

Harbor Branch Oceanographic Institution is the site for a new, innovative partnership designed to link marine scientists and engineers with science teachers and talented students at Lincoln Park Academy in St. Lucie County Florida. As the third largest oceanographic research facility in the United States, HBOI is in a unique position to provide a well-integrated suite of real-world experiences for gifted students in science and technology. Our partnership includes effective school and workplace based elements and provides a multitude of connecting links between the two environments. In 1997-1998 (the first year of the program), students have clearly demonstrated high academic achievement and high performance both in the classroom and at HBOI.

Our project has been recognized as a pacesetter in Florida. In 1997, HBOI received a Bronze award from Florida School to Work. This year we received both Silver and Gold Zone STW awards as well as a Commissioner's Eleventh Annual Business Recognition Award from the Florida Department of Education.

We feel that our program meets the criteria for selection as a national model for STW programs that focus on gifted students. Our entire program is a network of connecting activities. Everything that we do links the school, student and workplace. We are especially strong in the areas of vision, talent development, partnerships, integrated curriculum, classroom supports and innovative approaches. There is less specific programatic focus on parental involvement, career and academic planning, supporting materials and student assessment in part because these elements are standard components of the school-based programs to which the project is linked.

Our model is multi-level, designed to connect talented students with scientific mentors and high quality real-world science at key times during the educational sequence. The LPA-Harborside mini-marine science academy located on the Harbor Branch campus is the central element of the program and provides a 'capstone' experience for juniors and seniors during the school year. Other important elements are summer research internships (for juniors and recent LPA graduates), intensive science fair summer camps (for entering 9th graders), and field and laboratory activities for middle school students from the LPA lower school. Links to even younger students have been forged by requiring LPA seniors to design and implement marine science activities for students from Lakewood Park Elementary near the HBOI campus.

We suspect that our program is different from most GT/STW programs in several ways that should add to its value as a national model. First, as a private non-profit 'soft-money' driven research, HBOI is a different breed of STW business partner. Although our culture is somewhat difficult to categorize, we fall somewhere in the middle along an organizational continuum from pure 'money-making' businesses at one end to complex, subsidized school district bureaucracies at the other. Much like an effective small business (and unlike most school systems), our organizational structure is flexible and responsive so that we can quickly take action to move into 'cutting edge' areas as

research and technology development agendas change. On the other hand, we do recognize the need for and have set up simple but adequate procedures for planning and maintaining high intellectual, educational and student conduct standards.

Students on our campus experience a rich research environment where advanced technologies and techniques are used every day to advance knowledge. Students are exposed to a broad diversity of people, approaches and attitudes that go well beyond what even the best high school can offer. Some staff role models are academicians who focus on basic scientific questions and hold university faculty positions at a number of collaborating academic institutions. Other individuals use business principles and applied technologies to approach practical real-world problems in aquaculture (food from the sea) and potential biomedical applications (drugs from the sea). Still other employees use engineering concepts and advanced technology to perform industrial tasks on-board ship and underwater. HBOI also employs a wide range of support staff from accountants, librarians and administrative assistants to fund-raisers, carpenters and submersible pilots.

Another feature that may be of interest is that our staff are <u>not</u> familiar with organized GTE programs and associations (at either national or regional levels). Although this might be considered a deficiency in our program (and in this submission), we feel that our naiveté is actually an advantage. We submit that all government offices or bureaucracies (including National STW) need to continually reach out and effectively communicate to people and groups who are 'outside the box' and less versed in the jargon and ways of thinking routinely practiced by the group. Inviting us into your arena will broaden your perspective!

The final area where we may be able to contribute a unique perspective is in fund-raising. For our program, traditional sources alone will not be enough to allow program continuation and enrichment after the 'seed money' phase ends. Scientists at grant-driven 'soft money' institutions such as HBOI simply can not volunteer much of their time without experiencing both individual and institutional 'burnout'. Some provision must be made to provide moderate levels of externally funded 'release time'. We are just beginning to address this issue. As we work to build annual support and a program endowment from outside of the usual funding sources for school-based programs, a formal plan of attack and set of recommendations is being developed and will be available for us to share by early fall 1998.

A printed brochure describing our vision as well as specific opportunities for students is also in preparation and should be available for distribution in September. If we are selected for the symposium, the deadline for production of this document will be moved to late August.

Partnerships and key people

<u>Harbor Branch Oceanographic Institution</u>, a not-for-profit in Ft. Pierce Florida and the third largest ocean science research organization in the United States, is best known for its pioneering work in ocean engineering and technology. HBOI operates three

oceanographic ships supported by the National Science Foundation. We also deploy the Johnson Sea Link submersibles, unique underwater vehicles for exploring midwater regions and the ocean bottom between 2000 and 3000-ft. In addition, the institution is active in the areas of aquaculture technology transfer and training, biomedical marine research, research in basic marine ecology and physiology, and environmental monitoring and analysis.

The J. Seward Johnson Marine Education and Conference Center at Harbor Branch is a state of the art facility for science instruction with classrooms, laboratories, a video production and editing center. Center facilities also include a 350-seat auditorium with satellite downlink capability and a full array of field and laboratory equipment for hands-on work (microscopes, computers, a 14-passenger van, a pontoon boat for inshore work and a small trawler for continental shelf access).

The Center currently administers several federal grants for model program development (4 awards from the National Science Foundation, 1 award from the Environmental Protection Agency) and has offered academic programs at the college and graduate level since 1990. Since 1994, NSF has funded the SSU-HBOI Bridge Program, a Research Experiences for Undergraduates (REU) site designed to introduce underrepresented minority students to career opportunities and role models in the ocean sciences. A second NSF grant has underwritten the development of Career Opportunities in Science and Technology for Contemporary Women, a joint course with the Indian River Community College's Women's Program. This course provides role models and hands-on exposure to science to women in our area who range from advanced placement high school students to traditional college students to older reentry women. Other academic programs at the Center include a privately funded intern program and a sequence of graduate and advanced undergraduate courses in marine science that are accredited by the Florida Institute of Technology.

The principal HBOI players to date have been Drs. Shirley Pomponi and Susan Cook along with a cadre of scientists and technical staff who are eager to share their expertise and professional enthusiasm with young people (see Table I, page 9). Dr. Pomponi is Director of the HBOI Biomedical Marine Research Division and is a recognized expert in the cell biology and culture of invertebrate organisms. Her Division focuses on using biotechnological tools to study chemical compounds from marine organisms that may have significant potential as drugs for human diseases such as cancer and AIDS. Dr. Pomponi is HBOI chief scientific representative to numerous national and international professional and disciplinary groups such as the Counsel for Ocean Research and Education (CORE) and National Sea Grant.

Dr. Cook, the Director of the Education Division, has twenty years of experience as a research scientist, educator and project manager. Her expertise includes the development of 'hands-on' programs to involve students in scientific investigation, the formation of effective partnerships and the design of programs to foster increased diversity. Dr. Cook is the chief administrator for the Center's 3 NSF supported projects and PI on several smaller awards from the Environmental Education grants program of the U.S

EPA, the South Florida Water Management District and the Florida Dept. of Education. She is active in the geoscience education arena and has served on several NSF panels and working groups.

Lincoln Park Academy is the academic magnet school in St. Lucie County at the secondary (grades 9-12) and middle school levels (grades 6-8) as well as the site for the County's International Baccalaureate program for grades 9-12. In the late 1960s, the academic magnet concept was developed to defuse a tense situation associated with court-ordered busing and integration. Before integration, Lincoln Park Academy was the sole African American serving precollege educational institution between Melbourne and West Palm Beach. . Currently about 25% of LPA students are non-Caucasian.

Mrs. Mary Gregory, the chief International Baccalaureate biology faculty member at LPA, is a very talented scientist and teacher with over 30 years of experience overall and 10 years of leadership in the International Baccalaureate program. In 1994 she contacted Dr. Pomponi during a search for professional enrichment opportunities and has worked in Dr. Pomponi's laboratory every summer since with fellowship support from the American Society for Cell Biology, the American Society for Biochemistry and Molecular Biology and the Gertrude E. Skelly Foundation. Mrs.Gregory has been nominated for numerous regional and national science teaching awards and was a Florida finalist in the 1997 Presidential Awards for Excellence in Science and Mathematics competition. She is a co-investigator and consultant on multiple grants to HBOI and the School District.

In late spring of 1997, Dr. William Vogel, St. Lucie County School District Superintendent, and Dr. Mary Lou Goldberg, Principal of Lincoln Park Academy, learned about our efforts and quickly became strong, supportive advocates. Dr. Vogel had just become Superintendent and was delighted to discover that we had already begun to use a much more 'hands-on', learner-centered approach to science education that is in the mainstream of shifting paradigms for effective education for the 21st century. Dr. Goldberg's administrative expertise and previous work with science education within the Philadelphia School system has also been essential to our success. We have been amazed and heartened to experience how quickly action can be taken to move beyond a good concept (first proposed in March 1997) to the start of a successful pilot (September 1997) when the right leaders are in place!

If we are selected as a national model, the team we will send to Washington will include Dr. Goldberg, Mrs.Gregory, Dr. Pomponi, Dr. Cook and Dr. Vogel if his schedule permits. This team has already presented a workshop entitled 'The Birth and Growth of LPA-Harborside, a School within a Workplace' to the 1998 Florida STW Conference in Orlando. We would use this presentation as a framework and add a rich mix of examples from our pilot year experiences, successes and challenges.

Our vision and its context

Our broad vision is to bring proactive teachers and gifted students into a scientific and

technologically focused workplace where they can interact with scientists and technical staff on a multitude of levels from the highly intellectual and technical to casual sharing of personal interests. All of our efforts have been designed to capitalize on the great interest that both students and the general public have in better understanding and exploring the oceans. To the best of our knowledge, our program is the first example of a pre-college marine science academy being established within a professional ocean science research environment.

In the more traditional programs common within the oceanographic community, scientists either leave their work to visit classrooms, a relatively time-inefficient activity, or work with teachers with the expectation that the professional educators will serve as the primary translators or conveyors of facts, concepts and skills. Many ocean science facilities supplement these programs with 'stand-alone' internships that are not well linked to the educational system and serve a relatively restricted group of students with informal, indirect ties to the institution.

The STW concept is one that is NOT widely used (or even recognized as an option) within the ocean science community. Because of this unfamiliarity, there is a real need to promote the use of our model by a wider spectrum of earth and ocean scientists and educators. A proposal to NSF to fund expansion of our model and outreach to the broader ocean and earth science community is currently pending, but funding is very tight (over 120 proposals submitted with funding for less than 20 projects).

Recognition as a model on the national level will give us national exposure at a crucial time. It will improve our chances of NSF funding in the 1998-1999 cycle and encourage other oceanographic institutions and marine laboratories to adopt our approach. It should also help us to move forward with obtaining optimal support from our own management. Over the next 6-9 months, Harbor Branch will determine whether or not the institution should provide funds to renovate an existing building to provide a dedicated laboratory facility for pre-college education. National School to Work recognition of the value of our efforts will help tip the balance in favor of such use of institutional funds.

Program description and details

LPA: Harborside: the senior level mini-academy

In the first year (1997-1998) of our joint initiative, faculty and senior level students in Lincoln Park Academy's International Baccalaureate program spent roughly 2 ½ hours each day in classroom and laboratory settings at the J. Seward Johnson Marine Education and Conference Center on the HBOI campus. Two experienced secondary science educators (biologist Mary Gregory, and chemist Dr. Judith Megaw) worked hard to creatively incorporate marine science examples and content into LPA's International Baccalaureate curriculum and effectively use Harbor Branch staff as resources, instructors and role models. In addition to work at JSJMECC, students routinely participated in activities in state-of-the-art research laboratories in three HBOI divisions

and assisted on several research cruises on two HBOI vessels.

In year two of the model, the program size will double and encompass both LPA IB juniors and seniors. This expansion has been made possible by flexible, innovative block scheduling on the part of LPA administration. Students will work at Harborside for 4-5 hour blocks with juniors and seniors participating on alternate days. There will also be the flexibility to schedule several full school days each year at Harborside when needed for cruise work and long laboratory experiments.

The International Baccalaureate curriculum to which LPA-Harborside is linked contains academically challenging but relatively traditional biology and chemistry components. Even though the curriculum is highly structured, we have found it relatively easy to identify specific examples and real-world activities that relate to IB themes. Marine science is an excellent vehicle for such integration because it is a highly multi-disciplinary endeavor that can be readily linked to a variety of key scientific concepts. We have identified and developed over two dozen points of linkage that use cutting edge science to illustrate fundamental concepts so that students can master key principles and experience the excitement of discovery at the same time.

We have focused on examples in two primary areas: the structure and function of marine ecosystems and biomedical marine research. To provide some specific examples, students collected and analyzed biodiversity data in a comparison of two habitats and geographic locations in the Indian River Lagoon estuarine system in the fall of 1997. The following spring, students collected, compiled and graphed biological, chemical and physical data from RV SeaDiver and RV Skimmer cruises to 3 oceanographic stations on the east Florida continental shelf. The data will be used in a larger study of the effects of cold-water upwellings on the productivity and health of shelf ecosystems. In both modules, students learned first hand about instrumentation design and operation and principles of physical, chemical and biological oceanography.

In the Biomedical area, students were introduced to modern principles and techniques in molecular biology. In one lecture-laboratory unit, they focused on the PCR (polymerase chain reaction) technique and its use in making multiple copies of DNA. This procedure is the foundation of genetic fingerprinting both in humans and in studies of the interrelationships of marine organisms. Another biomedically focused component was participation in a national distance learning teleconference sponsored by the Howard Hughes Foundation on Neurology and Neural biology.

Throughout the Harborside framework, scientists interact with both teachers and students much more frequently and in a greater variety of ways than would otherwise be possible. Staff ranging from Division Directors to graduate students and research technicians give guest lectures, lead discussions and directly supervise student work in laboratory and field settings. Perhaps most importantly, scientists serve as role models within a realistic workplace setting. Table I on the next page lists HBOI and LPA staff in the pilot program.

Table I

Name	Title	Role
Dr. Susan Cook	Director, Johnson Center; Ph.D. Duke University	Chief administrative liaison; Harborside planning committee
Dr. Shirley Pomponi	Director, Biomedical Marine Research; Ph.D., U. Miami	Chief scientific advisor; Harborside planning committee
Dr. Amy Wright	Senior Scientist; DBMR; Ph.D. U. California, Berkeley	Chemical structure elucidation and instrumentation
Dr. Sue Sennett	Assistant Scientist; DBMR; Ph.D. U. Delaware	Chemical ecology, extraction of natural products; thin layer chromatography
Dr. Richard Isbrucker	Postdoctoral fellow; DBMR	Molecular biology
Dr. Jose Lopez	Postdoctoral fellow; DBMR	Molecular biology and systematics
Mr. Brian Kilday	Research specialist; DBMR	NMR as a research tool
Dr. Debra Krumm	Museum curator; Ph.D. University of Colorado	Systematics and evolution
Mr. Eric Annis	Graduate teaching associate	Marine ecology field work
Dr. Clay Cook	Senior Scientist, Marine Science; Ph.D. Duke University	Symbiosis; animal behavior
Dr. Edith Widder	Senior Scientist, Marine Science, Ph.D., U. Cal, Santa Barbara	Bioluminescence
Dr. Tamara Frank	Senior Scientist, Marine Science, Ph.D., U. Cal, Santa Barbara	Bioluminescence and vision in marine organisms
Dr. John Scarpa	Assistant Scientist, Aquaculture, PhD. Texas A&M University	Genetics of cultured organisms; aquaculture techniques
Mrs. Mary Gregory	BS, Stonehill College; MS in progress, Nova University	Lead teacher, biology
Dr. Judith Megaw	Science Dept. chair, LPA; Ph.D. Emory University	Lead teacher, chemistry

Classroom support facilities for LPA-Harborside include the auditorium satellite down-link facilities used for the Hughes Foundation program, full and rapid student access to the Internet over HBOI's T-1 line and the use of specialized, comfortable conference facilities for round table and panel discussions. Students have been able to access the full search capacities of a sophisticated marine science library and information center (with access to specialized scientific databases and CD-ROM archives in addition to the Internet). These facilities are not available on the home campus of Lincoln Park Academy or anywhere else in the School District.

We have been able to provide good support for students with a diversity of learning styles. Kinesthetic learners in particular have benefited from the heavy emphasis on 'hands-on' activities ranging from pulling seine nets to spotting chemical extracts onto thin-layer chromatography plates. The group project required of all IB juniors has fostered teamwork and allowed us to demonstrate how individual team members with different learning styles can contribute to a common goal or learning objective.

Internship components

For the past 3 summers, we have also provided real-world work experiences for LPA students. Most of our summer participants have been juniors who will be seniors the next year. Twenty-two students have participated in this program since its inception in 1995. From 1995- 1997, students volunteered their time and efforts. This coming summer, funding from the Governors Summer Program (Florida Dept. of Education) will allow us to provide small stipends for students who need financial assistance.

In this component, students work alongside undergraduates and graduate students in the HBOI Internship program and experience the full flavor of this program. Close one-on-one interactions with mentors are the core of each internship. Oral communication and leadership skills are developed by requiring the students to present short oral project summaries to an audience of HBOI scientists, staff and friends at the end of the summer.

During the school year, IB seniors must complete 4000 word extended essays and submit them as part of their portfolio for the program diploma. LPA-Harborside students who have completed appropriate summer internships are required to write their essays on projects supervised by HBOI scientists. There is also a tradition of participation in the Junior Science, Environmental and Humanities Symposium at the University of Florida each spring. This symposium (JSMHS) is in its 35th year of serving talented secondary students in the state and is organized by the Center for Precollege Education and Training at the University.

Overall Assessment and Student Achievement

Students in the International Baccalaureate program must demonstrate their proficiency and knowledge in multiple ways that can be used as tangible evidence for the success of our program. In addition to passing rigorous content area examinations, seniors must submit a highly structured documentary portfolio of drawings, photographs, journal observations and laboratory and field reports. Students are also evaluated on oral communication skills, writing skills (via the senior essay), and are required to demonstrate the ability to cooperate with team-members on a common project. An appreciation of principles of ethics and environmental sensitivity must also be demonstrated. High School graduation standards have not been altered by our program but the adoption of IB program assessment methods has clearly shifted the emphasis towards more performance-based assessment.

Exposure to a variety of scientific, technical and support careers is built into the basic fabric of our program. On a daily basis, students encounter role models who have a variety of educational levels and a wide range of interests. Our program encourages exploration of individual career and personal issues. For example, one student's extended essay focused on the backgrounds of successful women in science, while two junior summer interns outlined business plans for specific aquaculture ventures on oral presentation day.

Several Harborside students have been recognized for their academic accomplishments,

creativity and leadership qualities. Awards have included a 'spotlight in the news' award by TV Channel 12, a Young Floridian's award, a National Merit Scholarship and several finalist slots in the National Merit Scholar selection process.

Throughout Harborside, we have been impressed with how well the program helps LPA satisfy advanced Goal 3 Standards within the broader framework of Florida's Sunshine State Standards. In addition to helping LPA students 'successfully compete at the highest levels nationally and internationally', our partnership has made students much more aware of the environmental and ethics consequences of individual and societal actions. In one of the program's aquaculture modules, for example, there was very spirited and thought-provoking scientist-student discussion of ethical issues brought to the forefront by the use of genetic manipulation techniques in the aquaculture industry.

Although most parental involvement has been limited to attendance at 'ribbon-cutting' and orientation sessions (LPA-Harborside; Science Fair Summer Camp Sessions), parents are also invited to student poster displays (Science Fair Summer Camp) and oral presentations (Summer High School Intern Program).

Program Funding

The initial development of LPA-Harborside was underwritten by a Business Challenge Grant from the State of Florida, 'in-kind' and real dollar commitments from Harbor Branch and funds from the St. Lucie County School Board. The state grant has provided about $32,000 to support student transportation costs, program planning, supplies and partial salary support for HBOI staff. Harbor Branch has waived $10,000 in use fees (about half of the normal cost of JSJMECC facilities), has provided approximately $2000 in salary for staff preparation time and has agreed to provide 3 days of R/V Sea Diver time to give students 'at-sea' experience in the spring of 1998. The School District has covered LPA teacher salaries and additional staff to handle administrative responsibilities while the educators are working off campus at the HBOI site; the value of this is $28,864.

Activities below the Secondary School Level

For gifted students leaving middle school and moving to the secondary level, HBOI and LPA also work together on a summer science fair training project. Within a two week camp, students design and complete a self-contained research project. In 1997, the pilot program was run on a bare-bones budget by charging a modest tuition. In 1998, we have achieved a more optimum level of funding from the Florida Department of Education via the Governor's Summer Program for talented and gifted students. In 1998, an enrichment week for young women will be offered just prior to the more structured co-ed camp; this has been funded by a Model Projects grant from the Program for Women and Girls in the Education and Human Resources Directorate at NSF.

With funding from the Environmental Protection Agency in 1995, HBOI created Mangroves, Mosquitoes and Man, a 'critical thinking' based curriculum for upper

elementary and lower middle school students. In 1998-1999 we have been funded to link this program to middle school classrooms at LPA with grant support from the South Florida Water Management District and the County Mosquito Control District.

Cross-links with other regional GTE programs

Currently, we are exploring at least one connection to another highly rated program for gifted students in South Florida. Dr. Barbara Rothstein (working out of the North Miami Community School in Dade County) is currently developing two science magnet programs for gifted students in Dade County. One program focuses on environmental science with a second track emphasizing biomedical research applications. We are hoping to obtain funding for to support distance learning links and cross-program exchanges between teachers, students and scientists in both programs.

Program Strengths and Challenges

Our program has been very well received by students. Table II presents sample student comments from our mid-year evaluation.

Table II: Student Comments

Quotations from Student Comment period (oral and written); LPA seniors January 1998
We are provided with a classroom experience unobtainable at LPA and have the opportunity to explore many new ideas that we just would not be able to because of a lack of proper equipment. We get the best of both worlds in this respect. We get almost daily help from the employees at Harbor Branch. As a student in this program, I have access to an innovative computer lab, excellent laboratory facilities, eminent scientists and a library containing the latest scientific journals.
Harbor Branch is an extraordinary experience that combines both High School classes with a professional atmosphere. Students are treated on a more personal basis, which in turn, gives the students a relaxed attitude while learning.
It is good to see the application of the things we learn in a real life situation.
My experiences so far have broadened my horizons. Dr. Edie Widder's lecture was very interesting, so good that I would have paid had it not been free. I cannot think of any other experience this year at school that I would have paid to go to!

In our presentation at the recent Florida STW Conference, LPA principal Dr. Mary Lou Goldberg noted that the program has made a significant difference in overall student attitude and citizenship. There is much less horseplay and a much more serious attitude when students are on-site in an actual workplace.

Another strength of our joint program has been an increased ability to get away from daily classroom and office distractions to conduct effective planning sessions. At the series of 'planning retreats' that we have held on the HBOI campus, it has been remarkably easy to set goals, assess progress and determine priorities. Planning sessions have included key people from all levels (Superintendent, Assistant Superintendent, Principal, Teachers, IB Program Coordinators, HBOI program managers).

On the other hand, we are still grappling with the issue of communication flow between LPA faculty and HBOI scientific and administrative staff. The lack of an easy to use, reliable Internet and e-mail connection at LPA has hindered our efforts. We also need to devote more time to the needs and concerns of both scientists and the LPA faculty via regular meetings where all participants can interact. In the coming year, meetings will be held more regularly and we will add staff support to record points of view during back and forth discussion and provide a structured system for action-oriented follow-up.

Although HBOI staff have been uniformly positive about the program and have enjoyed their involvement very much, we clearly need to develop a reliable and continuing source of funding so that scientists can continue to contribute. A key issue is whether or not provision can be made to pay a share of the salaries of those involved in the program at a 'soft money' institution such as ours where scientific staff are continually challenged to cover their entire salaries from external funds.

We are working hard to identify and approach possible agency, business and community partners. Some possibilities include the State Department of Community Affairs (Coastal Zone Management Program), State Agricultural Extension Service, the USDA, the County Planning office, the County Mosquito Control District, Bell South, Florida Power and Light and Tropicana Industries. A regional office of the international drug conglomerate Novartis is located in Vero Beach just north of HBOI and the national office may be interested in our model. The networks of scientists and students that have been fostered and supported by the Howard Hughes Medical Institute also have promise as a source of information and collaboration.

Future Plans

At present, we foresee maintaining our primary partnership with Lincoln Park Academy but plan to open the program to students from other institutions who have been identified as gifted. Eventually we may also establish a smaller all-day academy for 20-25 juniors and seniors with a focused interest in marine science and technology. We also must develop a better strategy for expanding opportunities for minority and economically disadvantaged students in our relatively poor and demographically diverse county (35% non-Caucasian).

We feel that we have a great deal to offer as a regional and national model. Our situation is unique in a number of ways that we have already outlined. From an institutional point of view, we are eager to participate because we wish to learn from other models. We need to know more about what works and what doesn't for other programs.

Curriculum vitae
Dr. Susan B. Cook

Current position:

Director, J. Seward Johnson Marine Education and Conference Center
at Harbor Branch Oceanographic Institution, Inc.
5600 U.S. 1 North
Fort Pierce, Florida 34946
407-465-2400, extension 502; FAX 407-465-5743
E-Mail: scook@hboi.edu

Education:

Ph.D., Zoology, Duke University, 1970
B.S. with honors in biology, Tulane University, 1966

Faculty, scientific and administrative appointments:

Harbor Branch Oceanographic Institution, 1992 - present, Director, J. Seward Johnson Marine Education and Conference Center; Affiliate Professor, Department of Biology, Florida Institute of Technology.
Bermuda Biological Station, 1983 - 1992, Assistant Director for Education and Outreach.
The Bunting Institute of Radcliffe College, 1980-1983. Science Postdoctoral Scholar with Institute; also affiliated with the Museum of Comparative Zoology of Harvard University.
Ohio State University, 1975-80, Adjunct Assistant Professor.
University of California, Los Angeles, 1972-74, Lecturer.
University of Western Ontario, 1971-72, Instructor.
University of Georgia, 1970-71, Visiting Assistant Professor.

Administrative responsibilities and accomplishments:

At Harbor Branch Oceanographic Institution, responsible for program development and operation of the J. Seward Johnson Marine Education and Conference Center. Programs include undergraduate and graduate level courses, an internship program, and the development of a nationally recognized model program for introducing minority students to careers and research in the marine sciences.

Professional Organizations:

American Society of Zoologists (ASZ), Executive Committee; Chair of Educational Council 1994-1997
American Microscopical Society (AMS), Member at Large, Executive Committee
American Society of Limnology and Oceanography (ASLO), Education Committee
American Malacological Union (AMU)
California Malacozoological Society
National Biology Teachers Association (NABT)
National Science Teachers Association (NSTA)
Sigma Xi
The Oceanography Society (TOS)

Educational Grants and Contracts:

National Science Foundation, $108,844. The SSC-HBOI Undergraduate Summer Program: A Bridge to Research for Minority Students in the Marine Sciences. June 1994-May 1997.

National Science Foundation, $135,000. Research Experiences for Undergraduates at the Bermuda Biological Station. With A. M. Michaels, July 1991-June 1994.

Environmental Protection Agency, National Environmental Education Grants program, $31,629. Mangroves, Mosquitos and Man: adding a problem solving focus to existing educational materials at the 4th grade level, July 1995-July 1996.

St. Lucie County Mosquito Control District, $5000. Local funding for EPA grant 1995-1996.

National Association of Marine Laboratories, $10,000. Careers in Marine Science: A Diversity of Opportunity. With videographer, director and editor Brian Cousin. Completed in 1996.

Research interests:

Behavior, mortality, growth and reproduction of mollusks in tropical and subtropical rocky shore communities. Assessment of the effects of environmental stress on mollusks. Development of field and lab assays for the effects of heavy metals and ash leachate on molluscan larvae. Baseline monitoring of molluscan populations in southwest Florida seagrass beds.

Selected Publications

Cook, S.B., 1971. A study of homing behavior in *Siphonaria alternata*. Bio. Bull. 141: 449-457.

Cook, S.B. and C.B. Cook, 1978. Tidal amplitude and activity in the pulmonate limpets *Siphonaria normalis and S. alternata*. J. Exp. Mar. Biol. & Ecol. 35: 119-136.

Cook, S.B. and C.B. Cook, 1981. Activity patterns in *Siphonaria* populations: heading choice and the effects of size and grazing interval. J. Exp. Mar. Biol. & Ecol. 49: 69-79.

Verderber, G. S.B. Cook and C.B. Cook, 1982. The role of the home scar in reducing water loss in *Siphonaria alternata*. The Veliger 25: 235-243.

O. Hjelmar, J.B. Andersen, K.J. Andersen, E.Bjornestad, E.A. Hansen, A. Knap, K. Simmons, C. Cook, S. Cook, R. Jones, A. Murray, and T. Riggs, Assessment of the Environmental Impact of MSWI Ash Disposal in Bermuda, 1991. In: Proceedings of the AWMA's International Conference on Municipal Waste Combustion, Tampa, Florida.

Cook, S. B., 1991. Chapters 5 and 9. The Rocky Littoral. Open Water Systems. In A Guide to the Ecology of Shoreline and Shallow-Water Marine Communities of Bermuda. Bermuda Biological Station for Research Special Publication #30.

Cook, S.B., 1995. Shellwatch: a baseline monitoring program to detect changes in the unique molluscan communities adjacent to Sanibel Island. a community based monitoring effort at Sanibel Island, Florida. Fla. Game and Fresh Water Fish Comm. Non Game Wildl Program Project Report, 50pp+viii. Tallahassee, Fla.

Cook, S. B. and D. K. Krumm, 1996. From submersibles to seagrasses: education programs at Harbor Branch Oceanographic Institution. In The Coastal Ocean - Prospects for the 21st Century. Oceans 96 MTS/IEEE Conference Proceedings, Vol. 3, pg.14112-1413, MTS, Washington, DC.

Research grants:

Florida Non-Game Wildlife Program Grant, Shellwatch: a community based baseline monitoring program for molluscan communities adjacent to Sanibel Island, Florida, 1988-1990. Contract to Sanibel Captiva Conservation Foundation, $8,000; additional support from SCCF and Sanibel Captiva Shell Club.

Joint P.I., Bermuda Government contract: An assessment of the impact of the disposal of ash from the garbage burning incinerator proposed for Bermuda. In charge of ecotoxicological work and impact on rocky shore communities. 1988-1989. Biological portion, $150,000.

P.I., Office of Exploratory Research, U.S. Environmental Protection Agency award for research on the effects of environmental stress on subtropical limpets. 1984-end of January 1988, $97,000.

P.I. for 10 Earthwatch research teams, 1980-1984. Limpet ecology, $35,000.

Shirley A. Pomponi, Ph.D.

Director, Division of Biomedical Marine Research, Harbor Branch Oceanographic Institution, Inc.
5600 U.S. 1 North, Fort Pierce, FL 34946 Phone: 561-465-2400, ext. 449 Fax: 561-461-2221
E-mail: pomponi@hboi.edu Date of birth:July 19, 1949 Citizenship:U.S.

EDUCATION

B.A. (summa cum laude), 1971, Biology, College of St. Elizabeth, Convent Station, N.J.
M.S., 1974, Biological Oceanography, University of Miami, Rosenstiel School of Marine and Atmospheric Science (RSMAS), Miami, FL
Ph.D., 1977, Biological Oceanography, University of Miami, RSMAS

RESEARCH INTERESTS

For the past 25 years, I have conducted research on the systematics, ecology, physiology, and cell biology of marine sponges at the University of Miami, University of Maryland, SeaPharm Inc., and Harbor Branch Oceanographic Institution. During the past twelve years, this research has been focused on shallow and deep water sponges with biological activity. For the past eight years, research in my laboratory has been directed towards establishing cell lines of bioactive marine invertebrates and determining the role of associated microorganisms in the production of bioactive secondary metabolites. For the past two years, I have led the Harbor Branch Division of Biomedical Marine Research in the discovery of novel, marine-derived, biologically-active compounds with therapeutic potential. A major emphasis of our research is on the development of methods for sustainable use of marine resources for drug discovery and development.

RECENT PUBLICATIONS (1994-1996)

Gulavita, N.K., A.E. Wright, P.J. McCarthy, **S.A. Pomponi**, and R.E. Longley. 1996. Cytotoxic peptides from marine sponges. *Journal of Natural Toxins*. 5(2): (In Press).

Pomponi, S.A., J.K. Reed, A.E. Wright, P.J. McCarthy. 1996. Diversity and Bioactivity of Marine Sponges of the Caribbean: The Turks and Caicos Islands. *Caribbean Journal of Agriculture and Nautral Resources (CAJANAR)*. 1(1): (In Press).

Pomponi, S.A., R. Willoughby, M.E. Kaighn, A.E. Wright, S.H. Sennett, J.E. Thompson, J.E. Armstrong, and K.E. Gallagher. Culture of marine sponge cells. 1996. *In Vitro Cellular and Developmental Biology*, (In Press).

Reed, J.K., and **S.A. Pomponi**. 1996. Biodiversity and distribution of deep and shallow water sponges in the Bahamas. IN: *Proceedings of the 8th International Coral Reef Symposium*, June 24-29, 1996. (In Press)

Willenz, P., and **S.A. Pomponi**. 1996. A new deep sea coralline sponge from Turks and Caicos Islands: *Willardi caicosensis* gen. and sp. nov. (Demospongiae: Hadromerida). IN: Proceedings of the Xth Workshop on Atlanto-Mediterranean Sponge Taxonomy (Willenz, P. ed.), *Bulletin Del 'Institut Royal Des Sciences Naturelles De Belgique*, (In Press).

Peppard, J., V.P. Loo, M.A. Sills, D. Munster, **S.A. Pomponi**, and A.E. Wright. 1996. Characterization of an interleukin 6 cytokine family antagonist protein from a marine sponge, *Callyspongia sp. Journal of Biological Chemistry*. 271(13):7281-7284.

Coval, S.J., M.A. Conover, R. Mierzwa, A. King, M.S. Puar, D.W. Pfife, J-K Pai, R.E. Burrier, H-S Ahn, G.C. Boykow, M. Patel, and **S.A. Pomponi**. 1995. Wiedendiol-A and -B, cholesteryl ester transfer protein inhibitors from the marine sponge *Xestospongia wiedenmayeri*. *Bioorganic & Medicinal Chemistry Letters* 5:605-610.

Gulavita, N.K., **S.A. Pomponi**, A.E. Wright, M. Garay, and M.A. Sills. 1995. Aplysillin A, a thrombin receptor antagonist from the marine sponge, *Aplysina fistularis fulva*. *Journal of Natural Products* 58:954-957.

Gulavita, N.K., **S.A. Pomponi**, and A.E. Wright. 1994. Isolation and structure elucidation of Perthamide B, a novel peptide from the sponge *Theonella* sp. *Tet. Lett.* 35:6815-6818.

Gunasekera, **S.A. Pomponi** and P.J. McCarthy. 1994. Discobahamian A and B: New peptides from the Bahamian deep-water marine sponge, *Discodermia sp. J. Nat. Prod.* 57:79-83.

Kelly-Borges, M., E.V. Robinson, S.P. Gunasekera, M. Gunasekera, N.K. Gulavita, and **S.A. Pomponi.** 1994. Species differentiation in the marine sponge genus *Discodermia* (Demospongiae Lithistida): the utility of ethanol extract profiles as species-specific chemotaxonomic markers. *Biochemical Systematics and Ecology* 22:353-365.

Kelly-Borges, M. and **S.A. Pomponi.** 1994. Phylogeny and classification of lithistid sponges (Porifera Demospongiae): a preliminary assessment using ribosomal DNA sequence comparisons. *Molecular Marine Biology and Biotechnology* 3(2): 87-103.

Mierzwa, R., A. King, M.A. Conover, S.Tozzi, M.S. Puar, M.Patel, S.J. Coval and **S.A. Pomponi**. 1994. Verongamine, a novel bromotyrosine derived histamine h_3-antagonist from the marine sponge *Verongula gigantea*. *Journal of Natural Products* 57(1):175-177.

Pomponi, S.A. and R. Willoughby. 1994. Sponge cell culture for production of bioactive metabolites. IN: *Sponges In Time and Space* (van Soest, van Kempen, and Braekman, eds), Balkema, Rotterdam, pp. 395-400.

Yentsch, C.M. and **S.A. Pomponi**. 1994. Strategies for flow cytometric analysis of marine microalgae and sponge cells. IN: *Methods in Cell Bioogy*. Vol. 42: Flow Cytometry. 2nd ed. San Diego, CA, Academic Press. pp. 523-538.

SELECTED PUBLICATIONS RELATED TO THIS PROJECT

Pomponi, S.A. and R. Willoughby. 1994. Sponge cell culture for production of bioactive metabolites. IN: *Sponges In Time and Space* (van Soest, van Kempen, and Braekman, eds), Balkema, Rotterdam, pp. 395-400.

Pomponi, S.A., R. Willoughby, M.E. Kaighn, A.E. Wright. Development of techniques for in vitro production of bioactive natural products from marine sponges. Invited chapter submitted: *Invertebrate Cell Culture: Novel Directions and Biotechnology Applications* (K. Maramorosch and J. Mitsuhashi, eds.)

Pomponi, S.A., R. Willoughby, M. Kelly-Borges. Sponge cell culture. Invited chapter submitted: *Molecular Approaches to the Study of the Ocean* (K. Cooksey, ed.), Chapman & Hall.

CURRENT RESEARCH FUNDING

Project # R/LR-MB-2 (National Sea Grant Marine Biotechnology Award): Production of the Ecteinascidins: Biomedically Important Marine Natural Products through Cell Culture of *Ecteinascidia turbinata*. S.A. Pomponi & A.E. Wright, P.I.'s.$427,531. 9/1/94 - 8/31/97.

Project # 70NANB5H1090 (Dept. of Commerce, NIST, ATP). P.I., subcontract from Aphios Corp. Marine Microorganisms and Saline Fermentation: A New Industrial Resource. $305,000. 9/1/95 - 8/31/97

National Institute of Water and Atmospheric Research, New Zealand (NIWA) Visiting Scientist Award. $11,110, 1/27/97 - 2/21/97. Cellular localization of bioactive metabolites and cell culture of bioactive marine sponges from New Zealand (in collaboration with Dr. Chris Battershill, NIWA).

Mary O'Connell Gregory
624 Fischer Hammock Road
Sebastian, Florida 32958
(561)589-3819

OBJECTIVE To conduct a Science Fair Summer Camp with an emphasis on opportunities for confidence building in girls.Further, to secure funding through the American Association of University Women as a means of bringing this Summer Camp to reality .

EXPERIENCE

1985-1996 Certified by the State of Florida as Teacher of Secondary Biology, Chemistry and General Science
Teacher at Lincoln Park Academy, Fort Pierce, Florida
Biology I, II, III, Research I, II, III, and IV.
Designer of curriculum for International Baccalaureate courses in both Higher Level and Subsidiary Level Biology II and III as well as Research Program.
Experience as Team Leader (4 teachers) and Science Department Head (8 teachers)
Chairman or member of numerous committees, including Budget, Dress Code, Attendance Policy, State Book Adoption, Accountability, and Cultural Diversity.
Teacher of the Year 1993
National Biology Teachers' of America runner up for Florida's Outstanding Biology Teacher Award for 1995

1996 Summer Research Fellow of American Society for Biochemistry and Molecular Biology in laboratories of Dr. Shirley Pomponi, Division of Biomedical Marine Research at Harbor Branch Oceanographic Institution.

1995 Summer Research Fellow of American Society for Cell Biology in same HBOI laboratory of Dr. Pomponi

1990 Summer employment as Lab Assistant
Doctors' Clinic, Vero Beach, Florida

1970-1985 Certified by the State of Massachusetts as Teacher of Secondary Biology, Chemistry and General Science
Teacher at Higgins Junior High School, Peabody, Massachusetts
Department Chairman for all sciences (13 teachers) for last twelve years of employment
Biology I, Physical Science, General Science

1981-1984 Laboratory Bench Technician Clinical Chem
J.B. Thomas Hospital, Peabody, Massachusetts

1967-1968 Laboratory technician invertebrate culture
Connecticut Valley Biological Supply
Southampton, Massachusetts

1966-1967 Teacher at South Junior High School
Pittsfield, Massachusetts

EDUCATION

Graduate level studies leading to Masters in Science Education
Nova University Ft. Lauderdale, FL 15 credits completed
4.0 GPA

Graduate level course in Cooperative Discipline
Jacksonville University Jacksonville, FL 3 credits awarded
4.0 GPA

Graduate level course in Microbiology with Lab
Salem State College Salem, MA 4 credits awarded
3.5 GPA

Undergraduate level courses leading to Bachelor of Science in Biology with minors in Chemistry and Education
Stonehill College North Easton, MA B.S. Degree awarded

Workshops and inservice courses including most recently:

Water Quality Management	Brevard Community College
Oceanography	Brevard Community College
Biology Update	Indian River Community College
Chemistry Update	Indian River Community College
Cultural Awareness	St. Lucie School Board Inservice
Computer Literacy	St. Lucie School Board Inservice
Assertive Discipline	St. Lucie School Board Inservice

MOST RECENT ACTIVITIES

Member of National Association of Biology Teachers

Attended 1995 NABT Convention and participated in ASCB symposium

Attended 1995 ASCB Convention

Currently registered to attend the Winter Symposium for JSEHS at the University of Florida in Gainesville, bringing three speaker nominees and nine other 11th and 12th gradesrs.

Currently nominee for Presidential Award for Excellence in Science and Mathematics Teaching through the National Science Foundation

REFERENCES

Available upon request.

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HARBOR BRANCH NEWS

New Programs at JSJMECC

Lincoln Park Academy (LPA) Harborside

An innovate partnership teaming advance level baccalaureate high school senior students from Lincoln Park Academy with the scientists and resources of HBOI began the week of August 25, 1997. This program, dubbed "a school within a workplace," aims to provide students with education relevant to real world situations by bringing them into the workplace for a portion of their school day. In this pilot program, 47 students will be taught advanced biology, advanced chemistry and "Theory of Knowledge" at Harbor Branch's Marine Education and Conference Center for the duration of the 1997-1998 academic school year. These classes are being taught by Lincoln Park Academy faculty, Mrs. Mary Gregory and Dr. Judy Megaw, with support from two student assistants. Students will participate in several HBOI-organized field trips and tours in association with their classroom studies, while interacting with working scientists in a variety of disciplines.

Education Director, Dr. Sue Cook, believes this partnership to be an important first step for HBOI to contribute to pre-college education in a manner that fits within a research setting. Dr. Cook also points out that this collaboration is the first of its kind to her knowledge wherein a major

1997 Science Fair

The Science Fair camp that was held in July was a great success. Nineteen students completed their 1997-1998 science fair projects during an action-packed 2 weeks at the Education Center. Each participant formulated a scientific question or hypothesis, collected data to answer the question and prepared a science fair exhibit board with the help of 5 JSJMECC group leaders (Jennifer Wright, Eric Closey, Ian Quitner, Mike Carroll and Dr. Susan Sennett). Mrs. Mary Gregory from Lincoln Park Academy served as Camp Director. Project topics ranged from a study of the frequency of lightning strikes in Florida to fieldwork on the role of seagrasses in fish and shrimp behavior to lab studies of chemicals in the tissues of marine organisms that may deter predation. All of these young people are now 9th graders in the International Baccalaureate Program at Lincoln Park Academy. Parent and student comments about the camp were very positive and we plan to continue and expand the session next summer.

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oceanographic institution has opened part of its campus to an academy that links scientists to talented students. "Students and faculty will have ready access to our resources - both- the people and the facilities - in a way that provides real world experiences," remarks Dr. Cook. "Furthermore, our approach is designed to make this connection easy and rewarding for scientists as well. At most research institutions, student-scientist contact is indirect, infrequent and dependent on voluntary contributions of time that cannot be long sustained. LPA - Harborside represents a 'better way', an innovative model that other institutions and school systems can emulate."

To commemorate this partnership, a ribbon cutting cer-emony was held at the J. Seward Johnson Marine Education and Conference Center on September 18, 1997. Speakers included Dr. William Vogel, Superintendent of Schools, St. Lucie County School Board; Dr. Mary Lou Goldberg, Principal of Lincoln Park Academy; Dr. Sue Cook, HBOI Education Director; and Dr. Shirley Pomponi, Director of Harbor Branch's Division of Biomedical Marine Research. Following the presentations in the auditorium, guests were given the opportunity to view demonstrations of the work performed thus far by some of the student participants and to hear firsthand accounts of their workplace experiences.

Minority Bridge Program

There were many successful completions and accolades for the National Science Foundation Minority Bridge Program. A high point of the courses was a cruise on the Research Vessel SEA DIVER to Lee Stocking Island in the Bahamas.

JSJMECC Receives $99,661 Grant

JSJMECC has received a $99,661 grant from the National Science Foundation to design and implement a new program to introduce young women and girls to careers in science and technology. The grant will begin October 1, 1997. In the spring of 1998, HBOI scientists from DBMR Marine Science and the Collections Museum will participate in a course on science careers with credit from Indian River Community College. A special week-long summer mentoring program for young girls who have completed the 8th grade will also be supported by this award and will be linked to the 1998 Science Fair camp.

Return to Harbor Branch News

Harbor Branch Oceanographic Institution
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Phone (561) 465-2400
Fax (561) 465-2446

Questions or comments about the HBOI Web pages may be e-mailed to:
webmaster@hboi.edu

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Harbor Branch Oceanographic Institution Celebrates the Official Opening of "A School Within A Workplace" Partnership with Lincoln Park Academy

Harbor Branch Oceanographic Institution, Inc. and the St. Lucie County School Board are proud to announce the inauguration of an innovative partnership through a business challenge grant which teams advanced level international baccalaureate senior students from Lincoln Park Academy with the scientists and resources of one of the nation's leading oceanographic research institutions. Lincoln Park Academy (LPA) - Harborside - a school within a workplace - aims to provide students with education relevant to real world situations by bringing them into the workplace for a portion of their school day. In this pilot program, 47 students will be taught advanced biology, advanced chemistry and theory of knowledge@ at Harbor Branch's Marine Education and Conference Center for the duration of the 1997 - 1998 academic school year. These classes are being taught by Lincoln Park Academy faculty, Mary Gregory and Judy Megaw, with support from two student assistants. Students will participate in several HBOI-organized field trips and tours in association with their classroom studies, while interacting with working scientists in a variety of disciplines. Harbor Branch's Education Director, Dr. Sue Cook believes this partnership to be an important first step for HBOI to contribute to pre-college education in a manner that fits within a research setting. Other formal education programs offered through the Marine Education and Conference Center, such as the internship and postdoctoral fellowship programs, are geared toward third and fourth year college students, graduate and doctoral students. Dr. Cook also points out that this collaboration is the first of its kind wherein a major oceanographic institution has opened part of its campus to an academy that links scientists to talented students, Students and faculty will have easy access to our unparalleled resources - both the people and the facilities - in a way that provides real world experiences. Furthermore, our approach is designed to make this connection easy and rewarding for scientists as well. At most research institutions, student-scientist contact is indirect, infrequent and dependent on voluntary contributions of time that cannot be long sustained. LPA - Harborside represents a >better way', an innovative model that other institutions and school systems can emulate.

To commemorate this partnership, a ribbon cutting ceremony was held at the J. Seward Johnson Marine Education & Conference Center at 3:00 p.m. on Thursday, September 18, 1997. Speakers included Dr. William Vogel, Superintendent of Schools, St. Lucie County School Board; Dr. Mary Lou Goldberg, Principal of Lincoln Park Academy; Dr. Sue Cook, Education Director, Harbor Branch Oceanographic Institution; and Dr. Shirley Pomponi, Director of Harbor Branch's Division of Biomedical Marine Research Program. Following the presentations in the auditorium, invited guests were given the opportunity to view demonstrations of the work performed thus far by the student participants and to hear firsthand accounts of their workplace experiences.

For additional information, please contact Susan Hanson at:

Tel: (561) 465-2400, extension 206
Fax: (561) 467-2061
email: hanson@hboi.edu

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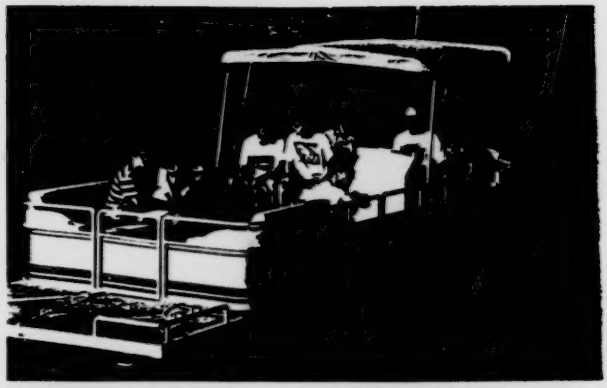
webmaster@hboi.edu

In addition to introducing students to the remarkable biodiversity of the area, another Center goal is to broaden student horizons about the use of advanced technology to study the oceans. A low-cost ROV (remotely operated vehicle) is available for student use.

Center staff share a strong commitment to helping faculty plan effective visiting programs and learn about opportunities for individual students. Faculty familiarization workshops are offered each year, and a detailed Users Guide is available. Graduate students and staff are available as guest lecturers and field trip coordinators for an additional fee.



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Organization _____

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Interested in further information on:

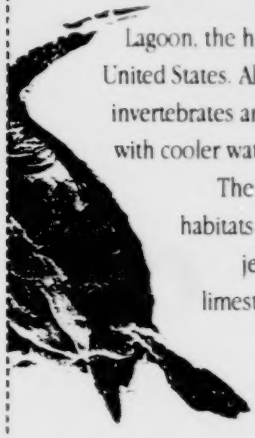
❑Courses ❑Internships ❑Post-Doctoral Awards

❑Programs for Visiting Groups

Area of Specialization/Interest: _____

_____

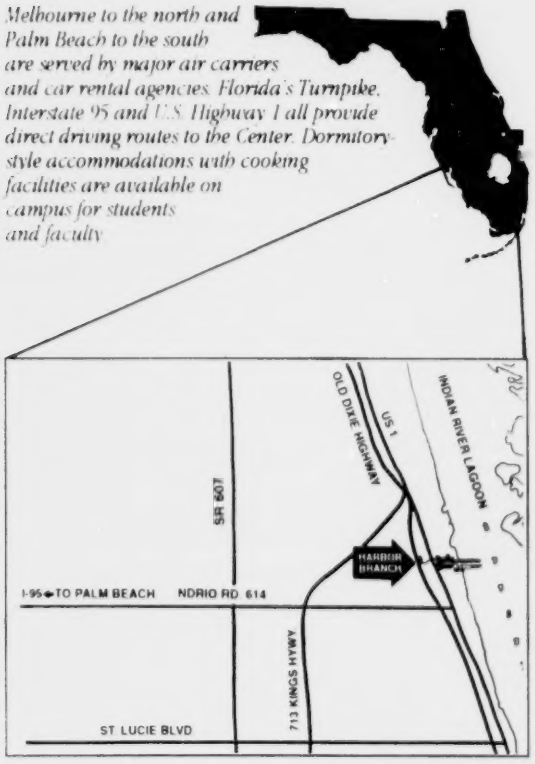
❑ I am a faculty member. Please send me a JSJMECC Users Guide.



The Center is located on the Indian River Lagoon, the highest diversity estuary in the continental United States. Along this section of Florida's coast, fishes, invertebrates and plants typical of the Caribbean overlap with cooler water species found north to Cape Hatteras. There is easy access to a wide range of ocean habitats: high energy barrier island beaches, rock jetties, sabellarid worm reefs and intertidal limestone outcrops. On the Lagoon side of the barrier islands, habitats include seagrass meadows, mangrove forests, saltmarshes, mud flats, sand bars and oyster beds.

The J. Seward Johnson Marine Education and Conference Center is the site for the educational programs of Harbor Branch Oceanographic Institution, an internationally recognized oceanographic research facility. The mission of the Education Division is to provide high quality instruction in marine and environmental science at the undergraduate and graduate level. Courses, internships and programs for visiting groups draw on the technological and scientific expertise of HBOI staff in marine science, aquaculture, ocean engineering, biomedical marine research and environmental chemistry. Many programs focus on marine biodiversity because of the Center's location on the Indian River Lagoon, an area where both Caribbean and cooler water species can be found.

Melbourne to the north and Palm Beach to the south are served by major air carriers and car rental agencies. Florida's Turnpike, Interstate 95 and U.S. Highway 1 all provide direct driving routes to the Center. Dormitory-style accommodations with cooking facilities are available on campus for students and faculty.



J. Seward Johnson Marine Education and Conference Center

5600 U.S. 1 North, Fort Pierce, FL 34946
(561) 465-2400, Ext. 500 • (800) 333-HBOI
FAX (561) 465-5743

Marine science education emphasizing the environment, biodiversity and technology

J. Seward Johnson Marine Education and Conference Center

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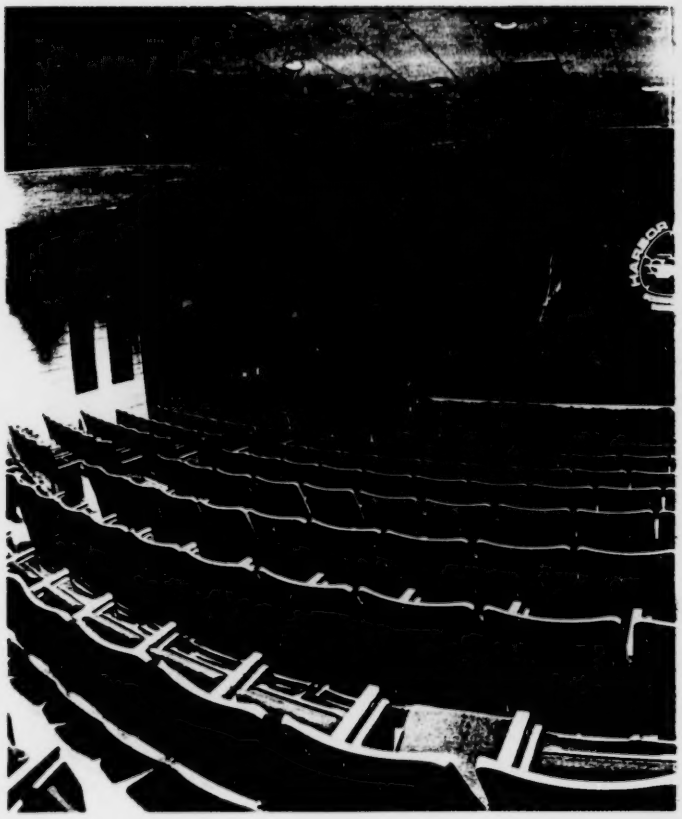

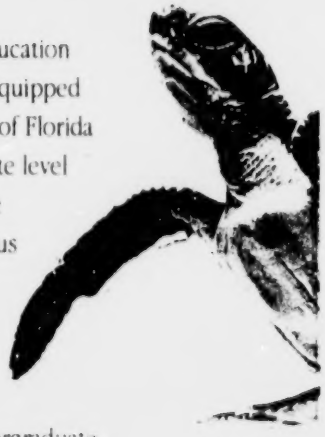

The J. Seward Johnson Marine Education and Conference Center is a well equipped teaching facility on the east coast of Florida specializing in college and graduate level instruction in marine science. The Center's educational activities focus on marine biodiversity, ocean technology and environmental science. Programs include accredited courses and internships for graduate and undergraduate students, postdoctoral fellowships and a visiting group program.

Each summer the Center offers a series of 2-5 week intensive courses in marine science. Courses are accredited through the Florida Institute of Technology in Melbourne, Florida and scholarship assistance is available.

Throughout the year, colleges may rent facilities for visiting field courses. Research opportunities include the HBOI postdoctoral fellowship program and a 10-week summer internship program for undergraduate and graduate students. Harbor Branch staff serve as thesis advisors for students enrolled in graduate programs at several Florida universities.

Access to field sites occurs via a 15-passenger van, an inshore pontoon boat or a 42-foot trawler. Field equipment includes seines, plankton nets, sieves, shovels and buckets. For programs involving snorkeling, the Center can arrange for

a graduate assistant to supervise water safety.

The Center's three teaching laboratories are equipped with dissecting and compound microscopes, a video microscope, saltwater aquaria, and a small library of identification guides and marine science videotapes. A student computer network provides access to the Internet. The building also contains a 350-seat auditorium with advanced audio-visual capabilities and two smaller rooms for lectures, workshops and conferences.

Students have 24-hour use of the Harbor Branch Oceanographic Library. The Harbor Branch Oceanographic Museum contains a reference collection of marine animals and plants and a smaller teaching collection for classroom use.

Campus housing with cooking facilities is available for students and faculty in all programs.

For visiting groups and field oriented courses, the Center provides a well equipped and convenient homebase for explorations of the natural history of South Florida, as well as the marine biology of the region. The Center is within a day's drive of colleges in South Carolina, Georgia and Florida and is accessible by air via Melbourne and West Palm Beach. Within two hours of the Center, groups can explore a variety of marine habitats, geological sites, terrestrial plant and animal communities, and the upper drainage basin for the Everglades. Everglades National Park and the Florida Keys reef tract are within a half day's drive.

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K-12 Resources and Initiatives
Johnson Marine Education Center, 1996-1997
Phone Contact 561-465-2400, ext. 500 or 428

Currently Available Classroom Programs and Materials

Classroom Presentations on HBOI, Oceanography and Topics Tailored to Teacher Needs. Lou Pesca, Volunteer, Harbor Branch Oceanographic Museum, no charge.

Teaching Collection of Preserved Marine Organisms available from Dr. Debra Krumm, Harbor Branch Oceanographic Museum, no charge.

Videotape on Careers in Marine Science and opportunities for students at marine laboratories in the National Association of Marine Laboratories (NAML) network. Appropriate for grades 9-12; $12.95 duplication/distribution fee. Free pamphlet on Careers available from Education Office.

Mangroves, Mosquitoes and Man, Teacher Resource and Curriculum Guide with Student Worksheets and Transparencies. This 4th-6th grade level curriculum consists of a sequence of hands-on activities (both classroom and field trips) that foster critical thinking skills and increase student awareness of mangrove habitats and the control of mosquito populations. Students explore the array of ecological, societal and economic factors that must be considered as citizens and local government decide how to manage local estuarine wetlands. Curriculum development was underwritten by the U.S. Environmental Protection Agency's Environmental Education Grants Program. A CD-ROM game ***"The Adventures of Indian River Jones"*** is under development. Funds are currently being sought to allow JSJMECC staff to assist teachers in St. Lucie County who wish to use the curriculum either in its entirety or as individual modules. A ***video on mangrove restoration efforts*** at HBOI can be checked out from JSJMECC.

Teacher In-Service and other training

JSJMECC can provide grant-supported ***teacher in-service training*** in the marine sciences to school systems in our area. The most recent example is a two-day program for St. Lucie County funded by Florida Blueprint 2000 in 1996.

Saturday workshops on marine science topics are already periodically offered to area educators. For further information on topics and fees, call Dr. Debra Krumm, Curator, Harbor Branch Oceanographic Museum, ext. 428.

Formal K-12 Programs and Partnerships

LPA-HBOI Environmental and Marine Science off-campus pilot program for International Baccalaureate biology and chemistry students. We anticipate that this collaborative effort will begin either in the fall or winter terms of the 1997-1998 school year. A partnership agreement with HBOI has also been signed with Lakewood Park Elementary School.

Summer Science Fair Camp for 8th grade students who will enter the 9th grade in the fall. In the summer of 1998, HBOI will offer a 2 week long pilot program to LPA students that will assist 20 students in completing a science fair project for the coming academic year. In future years we expect to expand this program to additional students and schools.

Special Programs for Women and Girls. HBOI expects to receive federal funds to offer two programs for young women in 1998. One program will be a winter term program at Indian River Community College to introduce young college and dual enrollment women to careers in science and technology. The second program will be a week-long session for 8th grade girls just prior to the Summer Science Fair Camp weeks in 1998.

Minority Programs. Since 1994, HBOI has received National Science Foundation funding for the 'Bridge to Research' program designed to introduce minority students in their first and second years of college to marine science careers and research. In conjunction with each summer's college level program in 1997, 1998 and 1999, we will offer opportunities to local pre-college students to meet and talk with the Bridge program students about their experiences with the program and marine science. In 1997, this mentoring component will be done in collaboration with the Young Researchers program sponsored by the Caribbean Marine Research Center, the Perry Foundation and the Education Foundation of Indian River County, Inc.

Additional Programs on the Harbor Branch campus

Secondary school field trips - hands-on marine science field trips include seining, plant walks, and behind-the-scenes tours of some of the Harbor Branch divisions with some of the scientists. Contact Dr. Debra Krumm at ext. 428 for information on scheduling and fees.

Public Harbor Branch tours - school groups can arrange tours as part of the regular public tour program ($3 per student). A special presentation can be arranged in the Discovery Room where volunteers speak to the students on marine organisms and students get to handle real specimens from the sea. Contact Jan Petri at ext. 421 to arrange a tour. Contact Dr. Debra Krumm at ext. 428 for Discovery Room presentations.

Friends of the Museum - Harbor Branch's Friends of the Museum is a public program that offers educational programs, field trips, and lectures for all ages year round. Contact Dr. Debra Krumm at ext. 428 about becoming a member.

Precollege (K-12) Resources and Initiatives, 1998-1999

J. Seward Johnson Marine Education & Conference Center

General information: 561-465-2400, ext. 512 (Jennifer Wright) or ext. 500 (Kim Roberts)

Classroom Programs and Materials for Teachers

Classroom Presentations on HBOI, Oceanography and Topics Tailored to Teacher Needs. Lou Pesca, Volunteer, Harbor Branch Oceanographic Museum, no charge; call extension 428.

Teaching Collection of Preserved Marine Organisms available from Dr. Debra Krumm, extension 428, Harbor Branch Oceanographic Museum, no charge.

Videotape on Careers in Marine Science and opportunities for students at marine laboratories in the National Association of Marine Laboratories (NAML) network. Appropriate for grades 9-12 and college; available from JSJMECC for a $12.95 duplication/ distribution fee. Free pamphlet on Careers available from Education Office, ext. 500.

Videotape on Marine Science Opportunities for Minority Students. Lively 15 minute video designed to interest students from underrepresented groups in marine science careers. Produced at HBOI by an African American film/video intern with funding from the National Science Foundation, the American Society for Limnology and Oceanography and the Southern Association of Marine Laboratories. Appropriate for grades 9-12 and college. Available at no cost from HBOI (ext. 500) and the Marine Biology Program at Savannah State University.

Mangroves, Mosquitoes and Man, Teacher Resource and Curriculum Guide with Student Worksheets and Transparencies. This 4th-6th grade level curriculum consists of a sequence of hands-on activities (both classroom and field trips) that foster critical thinking skills and increase student awareness of mangrove habitats and the control of mosquito populations. Students explore the array of ecological, societal and economic factors that must be considered as citizens and local government decide how to manage local estuarine wetlands. Curriculum development was underwritten by the U.S. Environmental Protection Agency's Environmental Education Grants Program and dissemination efforts in 1998 are partially underwritten by the South Florida Water Management District Water Resources Partners program. A limited amount of SFWMD funding for ***field trip transportation*** (bus charges etc.) is available. A ***video on mangrove restoration efforts*** at HBOI can be checked out from JSJMECC. A CD-ROM game ***"The Adventures of Indian River Jones"*** is under development. Contact Holly Hoier at ext. 504.

Teacher In-Service and other training

JSJMECC facilities and staff are available for grant-supported ***teacher in-service training*** in the marine and environmental sciences. An example is a two-day program for St. Lucie County funded by Florida Blueprint 2000 in 1996. Contact Holly Hoier, ext. 504 or Jennifer Wright, ext. 512.

Saturday workshops on marine science topics are periodically offered to the public and area educators under the auspices of the Friends of the Museum organization. Harbor Branch's Friends of the Museum is a public program that offers educational programs, field trips, and lectures for all ages year round. For further details, contact Jennifer Wright at ext. 512 or Dr. Debra Krumm, Curator, ext. 428.

K-12 Programs and Initiatives at HBOI

LPA Harborside: A School within a Workplace. School to Work affiliated program for International Baccalaureate biology, chemistry and mathematics students at Lincoln Park Academy in St. Lucie County. Approximately 100 juniors and senior attend classes at the Johnson Education Center. Contact with scientific staff and use of advanced technology in a real-world workplace is an integral part of the program. HBOI received a State of Florida's STW Gold School to Work Zone award for the pilot program in 1997-1998 and a Commissioner's Business Partner's award. The second year of the program (1998-1999) is funded by a Business Challenge Grant from the Florida Dept. of Education and a Geoscience Education development grant from the National Science Foundation in Washington, DC.

Summer Science Fair Camp for 8th grade students in St. Lucie County who will enter the 9th grade in the fall. Open to rising 10th graders as space permits. Program restricted to students identified as gifted/talented or in the County International Baccalaureate program. Two sessions per summer of science fair project assistance by HBOI staff, affiliated graduate students and area science teachers. Each Camp provides 10 days of supervised project design, data collection and display production.

Everyday Ecology summer camps and after-school activities: Everyday Ecology, Florida Game and Fresh Water Fish Commission, Summer environmental education camps for disadvantaged children in St. Lucie and Indian River counties, three 'hands-on', activity-based summer camps of 2 week duration for elementary and middle school students; after-school activities on similar topics during school year; contact Jennifer Wright at ext. 512.

Secondary & middle school field trips - hands-on marine science field trips include seining, plant walks, and behind-the-scenes tours of some of the Harbor Branch divisions with some of the scientists. Contact Jennifer Wright at ext. 512 for information on scheduling and fees.

Careers in Science and Technology for Contemporary Women. A winter term program offered in collaboration with the Women's Program of Indian River Community College to introduce dual enrollment high school students, college and reentry women to careers in science and technology. Tuition for 1999 will be covered by a grant from the U.S. National Science Foundation. For further information, contact the Women's Program office at IRCC, 561-462-4739.

Minority Programs. Since 1994, HBOI has received National Science Foundation funding for the 'Bridge to Research' program designed to introduce minority students in their first and second years of college to marine science careers and research. In conjunction with this summer program, JSJMECC is able to offer opportunities to organized groups of local precollege students to meet and talk with the Bridge program students about their experiences with the program and marine science.

Public Harbor Branch tours - school groups can arrange tours as part of the regular public tour program ($3 per student). A special presentation can be arranged in the Discovery Room where volunteers speak to the students on marine organisms and students get to handle real specimens from the sea. Contact Jan Petri at ext. 421 to arrange a tour. Contact Jennifer Wright at ext. 428 for Discovery Room presentations.

COLLEGE & UNIVERSITY PROGRAMS, 1998-1999

J. Seward Johnson Marine Education & Conference Center
Unless otherwise noted, contact Jill Sunderland, ext. 506; 465-2400.

Postdoctoral Fellowships for collaborative work with HBOI staff. 7 awards of 18 month duration available in alternate years. At least one fellowship in each of the following areas: marine science, aquaculture, environmental analysis and monitoring, biomedical marine research and engineering. Next application deadline will be the spring of 2000 for positions to start January 2001.

Accredited Courses in marine science for graduate students and advanced undergraduates. Graduate Credit through Florida Institute of Technology in Melbourne, Florida. Typically 5 to 7 courses are offered each summer with instruction provided by HBOI staff and visiting scientists. Application deadline March 15 of each year.

Summer Internship Program, 10 weeks of hands-on research and support work for advanced undergraduates and graduate students. Funding for 12-15 students per summer. At least one award in marine science, aquaculture, environmental analysis and monitoring and marine education. Multiple awards (4-5 per summer) in biomedical marine research and engineering. Application deadline March 1 of each year.

NSF Bridge to Research Program for Underrepresented Minorities, collaborative program with Savannah State University. Sophomores from Florida, Georgia and adjacent states spend 4 weeks at SSU and 5 weeks at HBOI. Introduction to the research process, marine and environmental careers, mentoring by African-American scientists, small group research projects. Application deadline March 30 of each year.

Careers in Science and Technology for Contemporary Women. Career awareness course in the Women's Program at Indian River Community College. Currently funded by the National Science Foundation. Career exploration at IRCC followed by 'hands-on' activities at HBOI.

Marine Advanced Technology Education related activities. HBOI is the Florida Partner for the NSF funded MATE center at Monterey Peninsula College. Our role is to build interest in the MATE concept in Florida and link interested businesses and colleges to the national MATE website and clearinghouse on technical careers for community and 4- year college graduates. Contact person, Jennifer Wright, ext. 512.

Field Course Opportunities for Visiting Colleges and Universities. JSJMECC facilities are available for use by visiting college groups. Staff logistical and instructional help is available. **Workshops for College Faculty** on Florida marine environments and strategies for using our facility are offered each spring and summer.

From Submersibles to Seagrasses: Education Programs at Harbor Branch Oceanographic Institution

Susan B. Cook and Debra K. Krumm
Harbor Branch Oceanographic Institution
5600 US # 1 North
Ft. Pierce, FL 54946 USA

Abstract--The J. Seward Johnson Marine Education and Conference Center is a well equipped new facility on the campus of Harbor Branch Oceanographic Institution in Ft. Pierce, Florida. Programs for undergraduates and graduate students include accredited summer courses, research internships and volunteer opportunities as well as special programs for underrepresented minorities. The Center provides laboratory and field facilities for visiting field courses and runs an annual workshop for college faculty who are interested in learning more about the Center and adjacent marine and coastal environments. Because of HBOI's location between West Palm Beach and Cape Canaveral on Florida's east coast, the facility is an ideal base from which to explore the natural history, geology and marine ecology of South Florida. Existing JSJMECC programs emphasize the high biodiversity of the region and the range of easily accessible habitats including salt marshes, seagrass beds and high latitude coral reefs. Programs are being developed to introduce students to undersea technologies such as submersibles and remotely operated vehicles (ROVs). The Center has recently produced a video on marine science careers.

I. Introduction and Center Goals

Practical experience beyond the classroom is now widely recognized as an essential component in the career progression of successful scientists. Programs at marine laboratories and coastal research institutions represent an increasingly important way for students at all levels to gain experience and information about future careers in the ocean sciences and technology [1].

The J. Seward Johnson Marine Education and Conference Center (JSJMECC) is the site for the educational programs of Harbor Branch Oceanographic Institution, an internationally recognized oceanographic research facility. The mission of the Education Division is to provide high quality instruction in marine and environmental science at the undergraduate and graduate level. Courses, internships and programs for visiting groups draw on the technological and scientific expertise of HBOI staff in marine science, aquaculture, ocean engineering, biomedical marine research and environmental chemistry.

Many of the Center's programs focus on marine biodiversity because of JSJMECC's location on the Indian River Lagoon, an area where both Caribbean and cooler water species can be found. In addition to introducing students to the remarkable biodiversity of the area, a second goal is to broaden student horizons about the use of advanced technology to study the oceans. A low-cost ROV (remotely operated vehicle) is available for student use.

II. Local Environments

The Center is located on the Indian River Lagoon (IRL), a narrow estuary stretching about 250 km. from New Smyrna Beach to Jupiter. Along this section of Florida's coast, fishes, invertebrates and plants typical of the Caribbean overlap with cooler water species found north to Cape Hatteras. Species diversity is remarkably high most notably for seagrasses, fishes and infaunal crustaceans. Overall, the IRL is recognized as the highest diversity estuary in the continental United States [2].

In the vicinity of JSJMECC, there is easy access to a wide range of ocean habitats: high energy barrier island beaches, rock jetties, sabellarid worm reefs and intertidal limestone outcrops. On the Lagoon side of the barrier islands, habitats include seagrass meadows, manghove forests, salt marshes, mud flats, sand bars and oyster bars.

III. Facilities

The Center's three teaching laboratories are equipped with dissecting and compound microscopes, a video microscope, saltwater aquaria, and a small library of identification guides and marine science videotapes. A student computer network provides access to the Internet. The building also contains a 350 seat auditorium with advanced audiovisual capabilities and two additional classrooms for lectures and workshops.

Students have 24-hour use of the Harbor Branch Oceanographic Library. The Harbor Branch Oceanographic Museum contains a reference collection of marine animals and plants and a teaching collection for classroom use.

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Access to field sites occurs via a 15-passenger van, an inshore pontoon boat or a 42 ft. trawler. Field equipment includes seines, plankton nets, sieves, shovels, and buckets. For programs involving snorkeling, the Center can arrange for a graduate assistant to supervise water safety. The student ROV is a UAL vehicle that can be deployed from shore or from HBOI's smaller vessels.

IV. Programs

A. Courses

Each summer the Center teaches a series of 2-5 week courses in marine science. Courses are very intensive running from 9 AM to 5 PM each weekday. Two to five semester hours of credit can be earned from the Florida Institute of Technology, Melbourne, Fl. Financial aid in the form of partial tuition waivers is available. The course admission and financial aid deadline is March 15.

Specialized graduate level courses reflect the research specialties of HBOI staff. Other courses with a broader focus are aimed at advanced undergraduates as well as graduate students. Some courses are taught every other year; these include The Biology of Deep Sea Benthos, the Reproductive and Larval Ecology of Marine Invertebrates, and Transport Processes in Marine Environments. The Biology of Deep Sea Benthos program includes field work in the Tongue of the Ocean with opportunities for students to participate in submersible dives (Johnson- Sea-Link I or II).

Courses that are taught more often include Practical Aquaculture Techniques, Marine Fish Culture, The Ecology of Subtropical Fishes, Marine Invertebrate Zoology and Global Environmental Problems and Solutions. Undergraduates seeking an introduction to marine science may enroll in the Subtropical Marine Environments course.

B. Visiting Group Programs

Throughout the year, colleges may rent facilities for visiting field courses. For such groups, the Center provides a well equipped and convenient homebase for explorations of the natural history of south Florida, as well as the marine biology of the region. Within a 2 hour drive, groups can explore geological sites and terrestrial plant and animal communities. Everglades National Park and the Florida Keys reef tract are within a half day's drive.

Center staff share a strong commitment to helping faculty plan effective visiting programs and learn about opportunities for individual students. Faculty familiarization workshops are offered each year and a detailed Users Guide is available. Graduate students and staff can be hired as guest lecturers and field trip coordinators.

C. Research Opportunities

Research opportunities include a 10 week summer internship program for undergraduate and graduate students, a joint summer program with Savannah State College (SSC) for minority students in their freshman or sophomore years and the HBOI postdoctoral fellowship program. All interns, summer program participants and post-doctoral fellows are affiliated with a research division. These divisions are Marine Science, Aquaculture, Ocean Engineering, Biomedical Marine Research and the Environmental Laboratory (environmental monitoring and chemistry).

The deadlines for the intern program and the joint SSC-HBOI program are March 1 and March 15 respectively; postdoctoral applications are reviewed every other year and successful applicants are supported for 18 months. Further information and application forms for these programs can be obtained from the senior author.

Although HBOI is not a degree granting university, scientific staff may serve as thesis advisors for students enrolled in graduate programs at several Florida universities. Currently informal and formal affiliations exist with the Florida Institute of Technology and Florida Atlantic University. Students interested in graduate work should first contact the HBOI staff member whose research most closely parallels his or her interests.

V. Audiovisual Products

The Education Center staff includes a highly qualified video producer and editor who focuses on both internal and external projects. The Center's most recent product is a 12.5 minute video on educational opportunities at coastal laboratories [3] produced for the National Association of Marine Laboratories (NAML). For more information, contact the Harbor Branch Audio-Visual Department.

References

[1] H. M. Swain, D. R. Breininger, D. S. Busby, K. B. Clark, S. B. Cook, R. A. Day, D. E. De Freese, R. G. Gilmore, A. W. Hart, C. R. Hinkle, D. A. McArdle, P. M. Mikkelsen, W. G. Nelson and A. J. Zaborcak, "Introduction. Indian River Lagoon Biodiversity Conference," *Bull. Of Marine Science* vol. 57, pp. 1-7, 1995.

[2] K. R. Tenore, Networking the Infrastructure of Coastal Laboratories. Position paper from a workshop organized by the National Association of Marine Laboratories. *Biol. Bull.* Vol 190, pp. 293--298, 1996.

[3] B. Cousin and S. B. Cook, *Careers in Marine Science: A Diversity of Opportunities.* NAML, 1996. [HBOI video production / VHS]

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SCIENCE AND ENGINEERING STAFF
AREAS OF RESEARCH

AQUACULTURE:

CRESWELL, LEROY- Research Associate (M.Sc., University of Miami, 1983). Research areas are in invertebrate aquaculture and fisheries, hatchery design and operation, larval biology, diet development and culture methodology for tropical marine and estuarine invertebrates.

SCARPA, JOHN- Research Associate (Ph.D., Texas A & M University, 1989). Research emphasis on bivalve genome manipulation, delineating culture requirements of novel pharmacologically important species, determining effects of nutrition on immune function of fish, shrimp physiology as related to culture and enhancement of microalgal culture.

TUCKER, JOHN- Associate Research Scientist (Ph.D. College of William and Mary, 1983). Research areas include biology and culture of marine fish and their zooplanktonic foods, emphasizing reproduction, larval rearing, nutrition, health, and development.

VAUGHAN, DAVID- Division Director and Associate Research Scientist (Ph.D., Rutgers University, 1983). Research areas are shellfish aquaculture, clam, and oyster hatchery and growout technology, microalgae cultivation, shrimp polyculture.

BIOMEDICAL RESEARCH:

GUNASEKERA, SARATH- Group Leader, Senior Scientist, Marine Natural Products Chemistry (Ph.D., University of Sri Lanka, 1976). Research interests include marine natural products chemistry with an emphasis on biologically active compounds having potential medicinal value. Current research focuses on the discovery of biologically active compounds from sponges and deep-water microorganisms using enzymes that have potential as targets for therapeutic agents.

LONGLEY, ROSS- Group Leader, Immunology and Tumor Biology (Ph.D., University of Oklahoma, 1981). Research centers on a drug discovery program by which compounds derived from marine macro- and micro-organisms are analyzed for their ability to either; 1) modulate the growth and biological activities or normal, lymphoid cells which comprise the key elements of host defense against pathogens and the development of cancer; and 2) regulate the growth of neoplastic cells, both lymphoid and non-lymphoid in nature, through interference in specific activation/signal transduction pathways.

MCCARTHY, PETER- Group Leader, High Capacity Screening Laboratory (Ph.D., University of Kent at Canterbury, England, 1983). Research is directed towards the identification of novel natural products from mari IC macro-micro-organisms that show potential as new therapeutic agents. Specific projects include the identification of new targets for drug discovery; the implementation of high throughput screening assays; laboratory automation; and studying the mechanism of action of novel compounds. Other research interests include the mechanism of action of antifungal agents, with emphasis on compounds affecting the fungal cell wall.

POMPONI, SHIRLEY- Division Director and Group Leader, Sample Acquisition (Ph.D., University of Miami, 1977). Research interest include the systematics and cell culture of marine sponges with an emphasis on tropical shallow and deep water species that produce biologically active metabolites. Current research projects include; 1) cell culture of bioactive marine sponges and tunicates; and 2) morphological, biochemical, and molecular systematics of sponges.

BIOMEDICAL RESEARCH continued:

SENNETT, SUSAN- Senior Scientist, High Capacity Screening Laboratory (Ph.D., University of Delaware, Graduate College of Marine Studies, 1991). Current research projects include the discovery of bioactive marine natural products using enzymes that have potential as targets for therapeutic agents and the implementation of enzyme assays as high throughput screens. Other research interests include the role of bioactive metabolites in the marine environment, the localization of these compounds in the producing organisms and the potential use of bioactive compounds in sponge systematics.

WRIGHT, AMY- Group Leader, Marine Natural Products Chemistry (Ph.D., University of California, 1984). Current research interest focus around bioassay-guided isolation and structure elucidation of novel compounds from marine macro and microorganisms. Of special interest are those organisms derived from the deep-water habitats. Other research interest include collaborative studies on the role of secondary metabolites within the marine environment (chemical ecology); chemotaxononmic classification of the Proifera; and development of aqua and cell culture techniques to provide renewable supplies of therapeutically important marine invertebrates.

EDUCATION:

COOK, SUSAN B.- Division Director (Ph.D., Duke University, 1971). Research focuses on the behavior and reproductive biology of rocky shore and grassbed mollusks. Other interests include Mollusua conservation biology.

KRUMM, DEBRA- Harbor Branch Oceanographic Museum, Curator (Ph.D., University of Colorado, 1996). Interests in invertebrate paleontology with primary area of research in bioerosion. Related interests in bivalve systematic and coral reef ecology. Other interests include fauna history of the Indian River Lagoon and western Atlantic shelf off of Florida.

ENGINEERING:

CAIMI, FRANK M.- P.E., Electrical Engineering Manager (Ph.D., Carneigie-Mellon University, 1976). Primary research interest include navigation, control and positioning of underwater platforms by optical sensing or processing; sensing of chemical species, pollutants or physical parameters of aqueous media using hybrid optical technology; novel methods of signal or image analysis suited to underwater applications, computer vision, image processing/compression, fiber optic sensors, and techniques for detecting weak signals representative of chemical species present in liquid media.

CLARK, ANDREW M.- Division Director, P.E. (Ph.D., University of Hawaii, 1995). Research and development interests include solid mechanics and hydrodynamics, materials engineering/science, teleoperators and robotic system development of *in situ* undersea measurement and collection devices, and the design of undersea vehicles including manned, remotely operated and autonomous systems. Research currently underway includes design and structural behavior of deep ocean cable systems, marine materials and higher level manipulator systems for undersea vehicles.

LOPATA, MARC- Senior Engineer (M.Sc., Florida Atlantic University). Projects include material processing, navigation, and telemetry of underwater systems. Specializing in near-shore inland applications.

NEELEY, JERRY- Engineering Support Manager. Current projects include ROV operations, design and construction. Project management of at sea ocean related systems.

ENGINEERING continued:

TUSTING, ROBERT- Senior Systems Engineer. (M.Sc., BSEE, University of California, Berkeley). The development of underwater collection, measurement and quantitative photographic methods and electrical power systems.

ENVIRONMENTAL LABORATORY:

GINTAUTAS, PETER- Organic Supervisor (Ph.D., Colorado School of Mines, 1996). Research involving metal speciation in groundwater, soils and sediments and interactions of organic acids with mineral surfaces.

WANG, TSEN- Senior Scientist (Ph.D., University of Iowa, 1972). Research primarily involves environmental chemistry and technology in water quality, pollutant monitoring detoxification, waste assimilation, bioremediation and the pollution process.

MARINE SCIENCES:

COOK, CLAYTON- Senior Scientist, Symbiosis and Coral Biology (Ph.D., Duke University, 1970) Research focuses on the biology of invertebrates, algae symbiosis, particularly as it relates to reef corals and sea anemones. Interests include the investigation of cellular mechanisms that regulate the symbiosis, and how nitrogen is utilized and partitioned between the animal partner and its symbiotic algae. Broader interests include the general biology of coelenterates and the physiology of marine invertebrates.

GILMORE, GRANT- Senior Scientist, Fish Biology (Ph.D., Florida Institute of Technology, 1988). Ichthyological research has been concerned principally with *in situ* and experimental fish studies in fish ecology and life histories. Current fish investigations are based on diel and seasonal studies in population dynamics, migration, early life history, behavior, trophic relationships and reproductive biology in subtropical/tropical estuarine, coastal ecosystems and reef formations.

HANISAK, DENNIS- Division Director, Senior Scientist, Marine Botany, (Ph.D., University of Rhode Island, 1977). Current projects center on characterizing marine plant communities and elucidating their roles in marine systems. This research explores many facets of the physiology and ecology of these plants, including their primary production, nutrient uptake, and photobiology, as well as their cultivation and utilization as resources. Other projects involve seagrass ecology, seaweed mariculture, coral reef ecology, and community dynamics of estuarine macrophytes.

LAPOINTE, BRIAN E.- Associate Scientist, Marine Nutrient Dynamics (Ph.D., University of Florida, 1982). Program focuses on bottom-up controls of subtropical and tropical coastal ecosystems and includes studies on a variety of scales, ranging from oganismal to multiple, linked ecosystems. Ongoing research programs include assessment of the ecological effects of pulsed, high frequency nutrient discharges from wastewater-contaminated groundwaters in the Florida Keys into adjacent coastal waters.

SMITH, NED- Senior Scientist, Physical Oceanography (Ph.D., University of Wisconsin, 1972). Research activities include model-supported, descriptive studies of air-sea interaction in estuarine and continental shelf waters. Ongoing projects focus on coastal upwelling, wind-driven and tidal transport processes, low-frequency variations in water levels, and local air-water heat energy exchanges.

MARINE SCIENCES continued:

WIDDER, EDITH- Senior Scientist, Bioluminescence (Ph.D., University of California, Santa Barbara, 1982). General research emphasis is on behavior and physiology of bioluminescent organisms in the marine environment. Specific areas of interest include the mapping of organism distribution via bioluminescent signatures and computer image analysis; the photoecology of the midwater environment – how light, both biological and solar in origin, influences population dynamics; and optical instrumentation development and calibration.

YOUNG, CRAIG- Senior Scientist, Larval Ecology (Ph.D., University of Alberta, 1982). Interests include behavior and ecology of marine invertebrate larvae, reproductive biology of deep-sea invertebrates, ecology of sessile organisms, predator-prey interactions involving early life-history stages, and recruitment. Current projects include studies of reproductive seasonality at bathyal depths in the Bahamas, investigation of dispersal potential of larvae at hydrothermal vents, and work on vestimentiferan larval ecology at cold seeps in the Gulf of Mexico.

YOUNGBLUTH, MARSH- Senior Scientist, Water Column Ecology (Ph.D., Stanford University, 1973). Research concentrates on ecological processes and behavioral mechanisms that structure zooplankton food webs in coastal and open ocean regimes. Predator-prey strategies, particle transport dynamics, and mesopelagic biodiversity of soft-bodied species are of particular interest. Ongoing investigations include *in situ* observations and experiments with deep-water siphonophores and appendicularians.

Curriculum - 3 college credits
Tuition provided

I. Introduction to Non-Traditional Technological & Science Career Fields (4 weeks)
   a. Orientation, Objectives, & Schedule
   b. Explore Non-Traditional Opportunities in Science & Technology Careers
   c. Assessment & Personal Profile
   d. Regional Career Opportunities & Educational Paths
II. Science & Technology Applications (4 weeks)
   a. Computer Graphic Design & Geographic Information Systems
   b. Technology History & Modules
   c. Scientific Discovery & Research Methods
III. Hands-on Applications at Harbor Branch (8 weeks)
   a. Career Shadowing and Discussions with Scientists and Technicians
   b. Use of Advanced Technologies such as Low Light Video, Lasers, and ROVs (Remotely Operated Vehicles)
   c. Small Group Projects in Marine Science Research and Biomedical Marine Research
   d. Field trips to Marine Habitats and Laboratories such as the University of Florida's Medical Entomology Laboratory
IV. Mentoring Youth on Science Fair Projects

Tuition Provided

Through the auspices of the National Science Foundation, tuition will be provided. Students may include women and girls age 16 years and older.

Women's Program

Science and Technology Careers for Contemporary Women will be a new 3 college credit offering of the Women's Program at Indian River Community College. Our partnership with Harbor Branch Oceangraphic Institution will allow us to highlight careers, technologies, and skills related to the ocean.

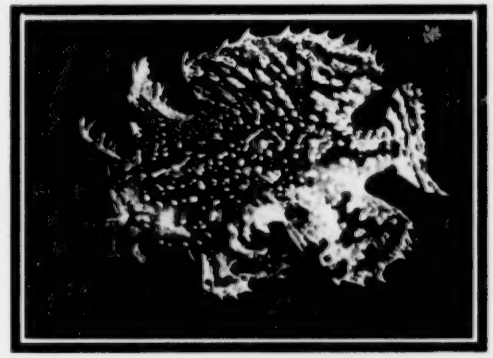
Accreditation

Indian River Community College is accredited by the Commission on Colleges of the Southern Association of Colleges and Schools (1866 Southern Lane, Decatur, Georgia, Telephone number 404-679-4501) to award Associate in Arts and Associate in Science degrees.

For More Information

To be considered for this selective entry course, contact the IRCC Women's Program for an application and interview.

Women's Program
Indian River Community College
3209 Virginia Avenue
Fort Pierce, Florida 34981
(561) 462-4739
From outside St. Lucie County
(Sebastian to Key West)
930-IRCC(4722)
From Okeechobee County **763-6327**



Science and Technology Careers for Contemporary Women

Indian River Community College

Fort Pierce
Stuart
Vero Beach
Okeechobee
Port St. Lucie

Announcing an exciting new course that encourages women to explore and discover science and technology focused careers.

Harbor Branch Oceanographic Institution has joined forces with the Indian River Community College Women's Program to introduce women to technical careers, the relevance of technology-rich science to life in the 21st century, the process of scientific discovery, and the fact that many women are successful and productive scientists and technologists.

The course will emphasize technologies that are important in contemporary business and industrial careers, while increasing awareness of the great variety of career paths in basic and applied science and engineering. This 3 credit college course is funded by the National Science Foundation.

Science and Technology Careers for Contemporary Women provides:

- Career counseling based upon assessment of interests, aptitudes, and personality.
- Encouragement and mentoring from real-life women who can serve as role-models.
- Gender sensitive teaching approaches that focus on the interests and concerns of women.
- Hands-on exposure to the excitement of scientific exploration and discovery.

Philosophy and Goals

Funded through a grant from the National Science Foundation, the course will:

- Build upon intrinsic interest in the ocean and expand student horizons to include technology, math, and physical science as well as biology.
- Incorporate and build on new knowledge to stimulate the interest of women in science.

- Draw on the talents of knowledgeable female scientists at HBOI, a research organization with "state of the art" expertise in ocean science and technology.
- Show students that women can be successful, productive scientists and engineers.
- Help students look closely at their own interests and identify preferences and strengths that can be helpful in a scientific or technical career.

ANNOUNCEMENT OF SUMMER INTERN PROGRAM

Administered By

HARBOR BRANCH OCEANOGRAPHIC INSTITUTION, INC.

Primary Funding By

THE LINK FOUNDATION

SUMMER INTERNSHIPS

in

Aquaculture, Ocean Engineering,
Environmental Analysis and Monitoring,
Marine Sciences, and
Biomedical Marine Research

Closing Date – March 1

Awards – April 1

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HARBOR BRANCH INTERNSHIP PROGRAM

Harbor Branch Oceanographic Institution, Inc. offers a Summer Intern Program to qualifying undergraduate and graduate students interested in aquaculture, ocean engineering, environmental analysis and monitoring, biomedical marine research, marine sciences and related fields. A major portion of the funding for the internship program is provided through the generosity of the Link Foundation. Also, funds are provided by Harbor Branch as well as various individual contributors.

The Link Foundation was established in 1953 by Mr. and Mrs. Edwin A. Link. It is the policy of the foundation to make grants to qualified non-profit organizations interested in the mastery of the air and sea, and the development of energy resources and their conservation. Harbor Branch supervises the Foundation's oceanographic research projects and also directs several high school student awards and college-level summer internships in ocean engineering and marine science.

Harbor Branch is a not-for-profit institution established in 1971, primarily for research in the marine sciences and for the development of tools and systems for underwater oceanographic investigations. The institution is dedicated to exploring the marine environment, understanding ecological balances, and investigating man's impact on that environment. Additionally, valuable research tools and equipment are produced from initial idea to finished product within the facilities of Harbor Branch. Harbor Branch is located on approximately 500 acres of land on the west bank of the Indian River lagoon portion of the Intracoastal Waterway between Vero Beach and Fort Pierce, Florida.

The Internship Program is designed to give both undergraduate and graduate students actual work experience in a research environment. The areas of study may include, but are not limited to, aquaculture, ocean engineering, marine biology, physical oceanography, environmental analysis and monitoring, marine natural products chemistry, cancer biology, microbiology, immunology, and sponge physiology and taxonomy or related research fields.

Due to the popularity of the program and limited funding, applications must be returned by March 1 . Awards are announced April 1 . The Summer Intern Program begins in early June and continues through mid-August (10 weeks).

ELIGIBILITY

1) Graduate Interns: Open to currently enrolled graduate students or to graduating seniors who have been accepted and are pre-registered for a graduate program.
   Undergraduate Interns: Open to students currently enrolled in a full-time program who have completed at least the equivalent of two years of college and are currently seeking a four-year degree.
2) Applicants must be in good academic standing as evidenced by submission of a current, official transcript.
3) Students must be at least eighteen (18) years of age.
4) Students who are not U.S. citizens must have a current visa with authorization to work or be on an educational visa. All other applicants must have a social security number.

TO APPLY

The following materials are to be submitted in application for this program:

1) Completed application form.
2) Official copy of college transcript.
3) Three (3) letters of reference from faculty.
4) Brief (one-page) essay outlining experience and career/research interests.
5) Candidates applying for Graduate Intern positions must submit proof of continuing education (copy of registration and letter of acceptance to graduate school).

HOUSING

All interns are responsible for their own housing and transportation. The Harbor Branch Education Office will provide limited assistance in locating suitable housing in the immediate area. On campus housing may be available on a first come, first served basis.

SCOPE OF WORK

Each intern will be assigned to work with a staff member in the appropriate area of interest. A project of mutual interest will be established and a plan of action developed. The degree of independent work or supervision required will be commensurate with the capability of the intern.

REPORTS

At the completion of the program, each participating student will be required to give an oral presentation and submit a comprehensive written report on their individual project.

APPROXIMATE COMPENSATION

Graduate Interns:	**$280.00/wk**
Undergraduate Interns:	**$200.00/wk**

HARBOR BRANCH
OCEANOGRAPHIC INSTITUTION INC.

5600 US 1 North
Ft. Pierce, Florida USA 34946

Phone (~~407~~ 561) 465-2400, ext. 500
FAX (~~407~~) 465-5743 E-MAIL: education@hboi.edu

SUMMER INTERN APPLICATION FORM

We consider applicants for all positions without regard to race, color, religion, sex, national origin, age, marital or veteran status, the presence of a non-job-related medical condition or handicap, or any other legally protected status.

(Please print)

Name _____
LAST FIRST MIDDLE

Address _____
NUMBER/STREET CITY STATE ZIP

Telephone ___(_____)_____ Social Security Number _____ / _____ / _____
Area Code

Permanent Mailing Address and Phone Number:

Name _____

Address _____
NUMBER/STREET CITY STATE ZIP

Telephone ___(_____)_____

Name of Principal Investigator you would like to work with: _____

Have you filed an application here before? ☐ Yes ☐ No If yes, date: _____/_____/_____

Have you ever been employed here before? ☐ Yes ☐ No If yes, date: _____/_____/_____

Are you prevented from lawfully becoming employed in this country because of Visa or Immigration Status? ☐ Yes ☐ No

(Proof of citizenship or immigration status will be required upon employment.)

Education	Elementary	High	College/Univ.	Graduate/Professional
School Name				
Years Completed/Degree	4 5 6 7 8	9 10 11 12	1 2 3 4	1 2 3 4
Diploma/Degree				
Describe Course of Study				
Describe Specialized Training, Apprenticeship, Skills and Extra-Curricular Activities				

Honors Received: State any additional information you feel may be helpful to us in considering your application.

_____

_____

_____

_____

_____

Employment Experience

List employment experience beginning with most recent and continuing in chronological order. Include military service assignments and volunteer activities. You may exclude organization names which indicate race, color, religion, gender, national origin, handicap or other protected status. If additional space is needed, please attach resume.

Employer Telephone ( )	Dates Employed From	To	Work Performed
Address			
Job Title	Hourly Rate/Salary Starting	Final	
Supervisor			
Reason for Leaving			

Employer Telephone ( )	Dates Employed From	To	Work Performed
Address			
Job Title	Hourly Rate/Salary Starting	Final	
Supervisor			
Reason for Leaving			

Special Skills and Qualifications – Summarize special skills and qualifications acquired from employment or other experience.

APPLICANT'S STATEMENT – I certify that answers given herein are true and complete to the best of my knowledge. I authorize investigation of all statements contained in this application for employment as may be necessary in arriving at an employment decision. The applicant understands that neither this document nor any offer of employment from the employer constitute an employment contract unless a specific document to that effect is executed by the employer in writing. In the event of employment, I understand that false or misleading information given in my application or interview(s) may result in discharge. I understand, also, that I am required to abide by all rules and regulations of the employer.

Signature of Applicant **Date**

Please mail application materials to: Summer Intern Program, Harbor Branch Oceanographic Institution, Inc., 5600 U.S. 1, North, Fort Pierce, Florida, USA 34946. Phone: (407) 465-2400, ext. 500. The Link Foundation and Harbor Branch Oceanographic Institution, Inc., provide equal opportunity regardless of sex, race, handicap, color and national or ethnic origin.

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SAVANNAH STATE UNIVERSITY

&

HARBOR BRANCH
OCEANOGRAPHIC INSTITUTION

announce

The 1998 SSU-HBOI Summer Undergraduate REU Program: A Bridge to Research in the Marine Sciences

funded by

OCEAN SCIENCES DIVISION
THE NATIONAL SCIENCE FOUNDATION

JUNE 15 - JULY 13 at Savannah State University
JULY 13 - AUGUST 7 at Harbor Branch Oceanographic Institution

Purpose & Location	This program is designed to introduce first and second year undergraduates from underrepresented minority groups to marine science and to basic principles of scientific research. The first 4 weeks of the program will take place in Savannah, Georgia on the campus of Savannah State University. Students will travel to Ft. Pierce, Florida for the final 4 weeks at the J. Seward Johnson Marine Education Center at Harbor Branch Oceanographic Institution.
Description	The program at SSU consists of a mixture of lectures, laboratories, field trips, and collaborative learning sessions to introduce students to marine science and the scientific method. At HBOI, students will learn about careers in marine science, will be introduced to ongoing research at the institution and will work (in groups of 2 or 3) on research projects under the supervision of a staff scientist. At both locations, the program will include visits to other marine laboratories and field trips to a diversity of marine habitats. Students will be introduced to oceanographic methods aboard the R/V Blue Fin at the Skidaway Institute of Oceanography and participate in a research cruise on either the R/V Edwin Link or R/V Sea diver at HBOI.
Stipends	Stipends of $2,250 will be provided for the 8-week full-time program. Students from outside the Savannah area can apply for limited travel assistance. Student housing is available at Savannah State University and Harbor Branch Oceanographic. The apartment-type housing at HBOI includes cooking facilities.
Eligibility	Applications are invited from students from underrepresented minority groups who are in their first or second year of college. Students in their junior or senior year may apply if they have not yet received 'hands on' research training. Participants must be U.S. citizens or permanent residents of the U.S. and its possessions.

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HARBOR BRANCH
OCEANOGRAPHIC INSTITUTION, INC.
J. Seward Johnson Marine Education & Conference Center

5600 U.S. 1 NORTH
FORT PIERCE, FLORIDA 34946

(561) 465-2400, Ext. 500
(800) 333-4264, Ext. 500
FAX (561) 465-5743

April, 1998

Dear Prospective Summer Student:

Thank you for your inquiry regarding our 1998 Summer Course Program. I have enclosed a copy of the 1998 Summer Program Brochure that gives all the details and descriptions of the courses offered this summer. The deadline of March 15 has passed but we are still accepting applications.

Currently, there are still spaces available in all courses. Admission decisions will be made upon receipt of this application. We will consider late applicants for scholarship funds that become available as students accept or decline offers that are now pending.

If you wish to be considered for these funds, please indicate this on your application. We hope to be able to make these awards by April 20, 1998.

Please remember that these positions are highly competitive so it is very important that your application and ALL supporting materials be submitted.

Sincerely,

Jill Sunderland

Jill Sunderland
Administrative Assistant
J. Seward Johnson Marine
Education and Conference Center

Enclosure

Contact Information:
Phone: 1-800-333-4264, ext. 506
FAX 1-561-465-5743
e-mail sunderland@hboi.edu
e-mail education@hboi.edu

BEST COPY AVAILABLE

What does Harbor Branch Oceanographic Institution have to offer you and your students?

- State-of-the-art classrooms and laboratories for visiting groups
- College-credit courses
- Student intern and postdoc programs
- Faculty workshops
- Comfortable dorms and faculty housing
- Fleet of vessels, submersibles, ROVs for research
- Smaller research vessels available for student groups
- Student ROV
- Biological research and teaching collection
- Conference facilities
- Audio-visual services and products available
- Environmental chemistry laboratory services available
- Short drive to the Florida Keys
- Access to variety of local environments including barrier island, mangrove swamp, Indian River Lagoon, Atlantic Ocean, Lake Okeechobee, cypress swamp, karst, Pleistocene dune ridge system

TO GET ON OUR MAILING LIST, WRITE TO:

Harbor Branch Oceanographic Institution
J. Seward Johnson Marine Education and Conference Center
5600 U.S. 1, North
Ft. Pierce, FL 34946
Attn.: Kim Roberts

FOR FURTHER INFORMATION CONTACT: (561) 465-2400

		Ext.
JSJMECC Education Division Director	Sue Cook, PhD,	502
Visiting student groups	Kim Roberts,	500
Research collection, K-12 programs; Field trips	Debra Krumm,	428
Conference facilities	Susan Costilow,	501
Use of research vessels, submersibles	Pam Keen,	271
Environmental Laboratory	Lorraine Sonoda,	285

or

email: education@hboi.edu

BROWSE OUR WEB SITE:
www.hboi.edu

VISITING STUDENT GROUPS
FEE SCHEDULE

1998 Group Rates:

- Student Laboratory Fee: $20 per student/day
- Dormitory use: $15 per student/day or $80/week, damage deposit if required
- HBOI house use: $15 per student/day or $80/week
- Pontoon boat (crew included): $100 per half-day (4 hrs.); $150 evening rate (4 hrs.); $200 per day (8 hrs.); (14 passengers, group leader, Grad Student, Captain, crew)
- R/V SKIMMER (crew included): $250 per half-day (4 hrs.); $300 evening rate (4 hrs.);$500 per day (8 hrs.); (8 passengers, crew) passenger Van: $70 per day/ $40 per half-day
- Graduate student help with lab and field exercises: per hr. (0-3 hrs.); $75 per half-day (4 hr); $150 per day (8 hrs.)
- Guest lecture by HBOI staff (when available): $85 per lecture
- Box lunches: $5.00 per person (if you fix your own lunch, we don't charge)

Facilities provided for all student groups:

The laboratory fee covers 24 hr. use of a student laboratory, access to JSJMECC computer facilities, access to the HBOI library and use of a lecture area with audiovisual equipment (including VHS video).

The J. Seward Johnson Marine Education and Conference Center (JSJMECC) van can be driven only by instructional staff who must have a valid U.S. automobile operators license (a chauffeur's license is not required) filed in the Education Office. Group leaders are responsible for returning the van with a full tank of gas. Group leaders should also be aware that HBOI insurance does not cover personal liability. For overnight van rentals there may be a mileage charge.

Laboratory and field equipment use is included in the laboratory fee, but boat and van use are not included.

Scheduling for Group Visits:

To reserve space for a group visit, contact the Education Office at HBOI 561-465-2400, ext. 500. Although tentative bookings can be handled over the phone, a group application form will be sent to you to be completed and returned to our office before final confirmation can be given. A $200 deposit is required along with the completed application form. This deposit will be applied to the total fees accrued. If you cancel more than 30 days before your trip, we will return $100 and keep $100 to cover our office costs. If you cancel within the 30 day window, we retain the $200.

ANNOUNCEMENT OF SUMMER INTERN PROGRAM

Administered By

HARBOR BRANCH OCEANOGRAPHIC INSTITUTION, INC.

Primary Funding By

THE LINK FOUNDATION

SUMMER INTERNSHIPS

in

Aquaculture, Ocean Engineering,
Environmental Analysis and Monitoring,
Marine Sciences, and
Biomedical Marine Research

Closing Date – March 1

Awards – April 1

HARBOR BRANCH
OCEANOGRAPHIC INSTITUTION INC.

5600 US 1 North
Ft. Pierce, Florida USA 34946

Phone ~~(407)~~ 561 465-2400, ext. 500
FAX ~~(407)~~ 465-5743 E-MAIL: education@hboi.edu

SUMMER INTERN APPLICATION FORM

We consider applicants for all positions without regard to race, color, religion, sex, national origin, age, marital or veteran status, the presence of a non-job-related medical condition or handicap, or any other legally protected status.

(Please print)

Name _____
LAST FIRST MIDDLE

Address _____
NUMBER/STREET CITY STATE ZIP

Telephone ___(_____)_____ Social Security Number _____ / _____ / _____
Area Code

Permanent Mailing Address and Phone Number:

Name _____

Address _____
NUMBER/STREET CITY STATE ZIP

Telephone ___(_____)_____

Name of Principal Investigator you would like to work with: _____

Have you filed an application here before? ☐ Yes ☐ No If yes, date: _____/_____/_____

Have you ever been employed here before? ☐ Yes ☐ No If yes, date: _____/_____/_____

Are you prevented from lawfully becoming employed in this country because of Visa or Immigration Status? ☐ Yes ☐ No

(Proof of citizenship or immigration status will be required upon employment.)

Education	Elementary	High	College/Univ.	Graduate/Professional
School Name				
Years Completed/Degree	4 5 6 7 8	9 10 11 12	1 2 3 4	1 2 3 4
Diploma/Degree				
Describe Course of Study				
Describe Specialized Training, Apprenticeship, Skills and Extra-Curricular Activities				

Honors Received: State any additional information you feel may be helpful to us in considering your application.

BEST COPY AVAILABLE

HARBOR BRANCH INSTITUTION, INC.
5600 U.S. 1 NORTH
FORT PIERCE, FLORIDA 34946
(407) 465-2400

To Applicants for Harbor Branch Postdoctoral Fellowships:

Enclosed are general information, instructions, and an application form to be used in applying for a postdoctoral fellowship at the Harbor Branch Institution, Inc. Applicants for the 1997-1998 fellowship cohort have already been selected.

Earlier this year the HBI fellowship program was changed to a new format. We now make non-renewable 18 month awards with applications due every second year. The next application deadline will be **15 April 1998**. Our goal is to send notices of acceptance in June 1998. The awards may begin in January of 1999 and will extend into the year 2000.

The applications consist of an essay, academic records, curriculum vitae, and letters from two referees. Each referee should have one complete copy of your essay upon which to base a reference letter.

Your application will be reviewed by members of the Harbor Branch research staff. It will be judged on the basis of your ability to conduct the proposed research and the contribution the Institution staff members and material resources can make to your intellectual advancement. The research project you outline will also be evaluated in relation to its potential contribution to current programs at Harbor Branch.

In developing your application, you may want to consult members of the staff in your field of interest. In any case, you should contact the staff member with whom you wish to work before submitting an application.

If you have special problems in completing the application, please write or call us.

Send all correspondence to Susan B. Cook, PhD., Director of Education.

Sincerely,

Susan B. Cook, Ph.D.
Director, J. Seward Johnson Marine Education and Conference Center

Enclosures

APPLICATION FOR HARBOR BRANCH INSTITUTION POSTDOCTORAL FELLOWSHIP

Use this form in applying for a Postdoctoral Fellowship of eighteen month's duration. Please prepare two copies of an essay and two copies of the following three pages as a cover sheet, in accordance with the attached instructions.

1. Name _____
   Last First Middle

2. Social Security Number_____

3. Permanent address_____
   Street
   _____
   City State Telephone

4. Current mailing address _____
   Street
   _____
   City State Telephone

5. Country of Citizenship_____ Marital Status_____

6. Current Visa type (if now in United States) _____ Expiration Date _____

7. Date of birth_____ Place of birth_____

8. Current employer or academic status_____

   _____

All degrees held (include expected date of Doctoral Degree), institutions and dates conferred:

_____

_____

_____

_____

9. Name and address of person to be notified in case of emergency:

_____

_____

10. Institutions from which graduate transcripts are being sent: (Please mark with an asterisk (*) any transcripts enclosed with this application).

_____

_____

_____

_____

11. Area of special research interests.

_____

_____

_____

12. Please indicate the name(s) of the Harbor Branch research staff with whom you wish to work most closely:

_____

_____

_____

13. **Financial Statement:**

I am applying for a Harbor Branch Institution Postdoctoral Fellowship at the $22,540 annual stipend level. I understand the travel allowance will be provided as follows:

One-way, tourist class air fare from your university residence to Melbourne, West Palm Beach or Orlando, Florida. In addition, limousine and/or auto rental fees will be paid from the airport to Harbor Branch Institution upon presentation of a receipt.

Use of personal auto in lieu of one-way air fare will be reimbursed at the then existing mileage rate (presently 25 cents per mile) up to an amount equal to one-way tourist class air fare. Upon arrival at Harbor Branch, air fare will be verified with a local travel agent.

Reimbursement for your travel to Harbor Branch Institution and the first stipend will be paid within three weeks after your starting date. The last stipend will be paid on the date of departure.

14. Do you plan to utilize scuba diving in your research? Yes____ No____

    Are you certified: Yes____ No _____

    If yes, year certified and by whom _____

    _____

15. Are additional equipment, supplies, laboratory, and/or other space requirements requested to accomplish the work proposed? Please list those. Each fellow receives a $600 supply allowance.

_____

_____

_____

_____

_____

16. Postdoctoral fellows and their dependent(s) are eligible to participate in the group health insurance, at their own expense. Sixty days after date of beginning of fellowship, Harbor Branch will participate by paying 80% of premium with the Postdoc paying 20%. The Postdoc can participate during the first 60 days by paying 100% of the premium.

17. The Institution encourages publication by Harbor Branch fellows. Some publication costs of manuscripts prepared by individual fellows will be supported, particularly the results of research conducted at the Institution.

18. At least two seminars are required of each fellow. One seminar reviewing the results of doctoral investigations should be presented shortly after arrival. The nature of research to be conducted during postdoctoral tenure should also be discussed at this time. A second seminar describing the results of studies completed at Harbor Branch is expected in the last month of the fellowship period.

19. Each fellow receives a $750.00 travel allowance for travel to meetings and/or field work.

_____ _____

DATE SIGNATURE OF APPLICANT

SCUBA DIVING

For reasons of safety and insurance, the following Harbor Branch policies must be strictly adhered to by all personnel (including full and part time employees, visitors, students, volunteers, summer interns, and Postdocs):

1. You may not scuba dive on a Harbor Branch project, use Harbor Branch diving equipment, or dive from a Harbor Branch small boat or ship, until you are certified as a Harbor Branch diver.

2. To become certified as a Harbor Branch diver, you must make an appointment with one of the Harbor Branch Dive Safety Officers (Patrick Pitts, Craig Caddigan, or John Reed) in order to: 1) complete certification forms, 2) register for a Harbor Branch dive course, and 3) schedule a physical examination.

3. Once you are certified as a Harbor Branch diver by a Dive Safety Officer, dive plans must be approved by one of the Harbor Branch Dive Safety Officers prior to each dive or dive trip. Please plan ahead and allow one week's notice.

4. Each diver must be recertified on a yearly basis. Those persons not certified as a Harbor Branch diver are not permitted to do any diving. If your work requires any diving and you are not Harbor Branch certified, then see your division supervisor to work out alternative arrangements such as the use of other qualified and certified personnel.

5. Any grant or contract that requires diving must be approved by the Harbor Branch Diving control Board.

It is important to note that our marine liability insurance only covers diving from the Harbor Branch small boats within a radius of 250 miles from Fort Pierce or from one of the three research vessels. Additional insurance coverage must be obtained prior to diving outside the 250 mile radius from Fort Pierce.

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Instructions for submitting an application for a Harbor Branch Institution Postdoctoral Fellowship

In making an application for a Harbor Branch Institution Fellowship, it is required that you prepare two copies of an essay and two copies of the application form.

ESSAY

The essay should:

1. Be no more than four pages in length.
2. Set forth a plan for your research in relation both to its discipline or field and to your own intellectual goals.
3. Reflect your estimate of the contributions which Harbor Branch staff members, collections, or special facilities are expected to make forward the success of your work.

Your essay should conform to the following outline:

1. In chronological order, describe your previous and current undertakings in research and independent study, specifying reports or publications associated with each.
2. Provide a description of your doctoral thesis research, including names of committee members and research results. Reprints of papers that would contribute to the evaluation of your thesis should be appended.
3. Describe the research you expect to undertake at the Institution. State your estimate of its relationship to and significance for your field as a whole. Discuss field and/or laboratory experiments designed to answer the questions you propose.

HARBOR BRANCH INSTITUTION, INC.
5600 U.S. 1 NORTH
FORT PIERCE, FLORIDA 34946
(407) 465-2400

To Referees for Harbor Branch Fellowship Applicants:

The Harbor Branch Institution offers fellowships to provide opportunities for recent recipients of the doctorate to pursue advanced research training within its facilities, under the guidance of members of its research staff. You are being asked by an applicant for a fellowship to serve as a referee and to evaluate a research proposal enclosed herewith.

We ask that you send us an evaluation based on the proposal and the education and research experience the applicant would derive from undertaking the project at Harbor Branch. We would especially like your advice about the applicant's ability generally, and about the further training needed for the best achievement of the individual's goals. Complete applications are due by April 3, 1998. **Please send your letter well in advance of that date.**

The application, the essay, academic records, and two supporting letters will be reviewed by members of Harbor Branch's research staff. Applications will be judged on the merit of the applicant's proposed work and the contribution the staff members and material resources of the Institution can make to the applicant's intellectual advancement.

Your careful assessment of this applicant will help us maintain high standards in our programs of higher education and research training. We appreciate your cooperation.

Please send your reply to Susan B. Cook, Ph.D., Director of Education, J. Seward Johnson Marine Education and Conference Center.

Sincerely,

Jill Sunderland

Jill Sunderland
Administrative Assistant
J. Seward Johnson Marine
Education and Conference Center

HARBOR BRANCH
OCEANOGRAPHIC INSTITUTION, INC.
J. Seward Johnson Marine Education & Conference Center

(561) 465-2400, Ext. 500
(800) 333-4264, Ext. 500
FAX (561) 465-5743

5600 U.S. 1 NORTH
FORT PIERCE, FLORIDA 34946

Dear Prospective Summer Intern:

Thank you for your inquiry about our 1998 Summer Intern Program. Unfortunately, the submission deadline for the 1998 program was March 1. We will place your name and address into our database and send the 1999 materials to you when they become available. If you haven't received this material by January 1999 you should contact us again to update your mailing address.

Sincerely,

Jill Sunderland

Jill Sunderland
Administrative Assistant
J. Seward Johnson Marine
Education and Conference Center

M://formltrs/internlate.doc
Updated 2/28/98

Pre Post

Your name:_____- Session I Session II

Circle one

Would you please take a few minutes to answer the following questions? Just answer to the best of your ability. This is NOT a test!

1. The weight of a material may be measured in
   A. milliliters B. grams C. meters D. all of these

2. The best fish food is probably
   A. cereal and grains
   B. plant and vegetable
   C. meat and dairy protein
   D. ground up invertebrates,fish, and algae

3. A pipette is
   A. an instrument used to measure liquid volume
   B. a tube used as an exhaust for gases
   C. a type of slender fish
   D. a tool used to adjust a microscope

4. The Indian River Lagoon is
   A. located only in Indian River County.
   B. the ocean, east of Hutchison Island.
   C. a long, narrow body of water between the barrier island and the mainland...including the area from about Melbourne to Stuart.
   D. a small coral reef island in the Indian River.

5. A seine net is
   A. a net with fine openings...much like gauze...that only the water passes through
   B. a large net made of rope, held rigid by two poles, with openings small enough to trap fish
   C. a fine net attached to one long pole, like a butterfly net
   D. a small, hand-held bucket, with a strainer in the bottom

13. Imagine that your teacher gave you the following list of problems and told you that you would be expected to design some kind of a test to arrive at an answer for three of them. Pick out the ones which would probably be your first, second and third choice problems to solve.

_____ Is there a connection between the number of fish caught at various sites and the salinity of the water at those sites?

_____ A student has two good friends. Suddenly they both stop calling. How can this student find out what is wrong?

_____ What is the most popular action television show for teenagers between 13 and 16?

_____ Do fish prefer to hide in seagrass or under reef formations?

_____ Which type of golf ball is best for chip shots?

_____ Do darker colors of nail polish chip faster than lighter colors?

_____ Which personality type is most likely to go to the prom with a date?

_____ Which style of paper airplane will travel the greatest distance?

_____ Are there chemicals present in algae which could kill bread mold?

_____ Do aquatic plants give off more oxygen in the day or at night?

JUmp STart WEek for GIRLS (*JUST WE GIRLS*) session II July 6-9, 1998

Schedule

Tuesday, July 7	9:00	**DTA-3**	Bus Arrival	
		DTA-3	Introduction to collecting Explanation of forms Techniques of collecting (bag, number, freeze)	John Reed
	9:30	**Van(s)**	Travel to collection sites and Collections	John Reed Deanna Clement Kathy Daumer Gina Paduano
	12:00	**DTA-3**	Lunch	Deanna, Kathy, Gina
	12:30	**Bio Lab**	Key, Identify, Complete Site Notes	Debbie Krumm (or substitute) Deanna Kathy Gina
			(1:00-2:00 concurrently prep of plates for feeding	Robin Willoughby Susan Sennett)
	1:45	**Bio Lab**	Clean up and move back to DTA-3	Deanna, Kathy, Gina
	2:00	**DTA-3**	Bus Arrival	

JUmp STart WEek for GIRLS (*JUST WE GIRLS*) session II July 6-9, 1998

Schedule

Wed., July 8	9:00	**DTA-3**	Bus Arrival, Move to Bio Lab	Deanna Clement Kathy Daumer
	9:10	**Bio Lab**	Preparation of Extracts, Techniques of Pipetting	Robin Willoughby Susan Sennett Deanna Kathy
	10:00	**Bio Lab**	Disc Diffusion Assay	Peter McCarthy Deanna Kathy
	10:30	**Bio Lab**	Fish Feeding I (introduction of variables)	Tammy Frank Robin Willoughby Deanna Kathy
	11:30	**DTA-3**	Lunch	Deanna, Kathy
	12:00	**Bio Lab**	Protein and solution experiment	Robin Willoughby Deanna Kathy
	1:45	**Bio Lab**	Clean up and move back to DTA-3	Deanna, Kathy
	2:00	**DTA-3**	Bus Arrival	

A cluster of sipunculan worms (*Themiste lageniformis*) from an oyster bed in the Indian River Lagoon. Two individuals have feeding organs extended to filter suspended material out of the water.

Photo by Tom Smoyer

Join Us

1998

Summer Program

HARBOR BRANCH OCEANOGRAPHIC INSTITUTION

J. Seward Johnson Marine Education and Conference Center

5600 U. S. 1 North

Ft. Pierce, FL 34946

PHONE 800-333-4264, Ext. 500

FAX 561-465-5743

WEBSITE www.hboi.edu

EMAIL ADDRESS education@hboi.edu

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1998 COURSES

The Biology of Sea Turtles, May 11-22

Dr. Jeanette Wyneken (Florida Atlantic University). This intensive lecture, lab and field course introduces the behavioral, ecological and evolutionary adaptations of these threatened or endangered animals. Major themes will include functional anatomy, diving physiology, migratory behavior, sensory biology, orientation and navigation, ecological specializations, threats to survival and conservation strategies. 3 semester hours, $1,650 tuition; $160 for dormitory housing.

Reproductive and Larval Ecology of Marine Invertebrates, May 11-30

Dr. Craig Young (HBOI). Ecological aspects of invertebrate reproduction, larval biology, embryology and recruitment, illustrated primarily by local species. Labs emphasize culture methods; field work introduces *in situ* methods for studying recruitment, larval behavior and species interactions involving early life history stages. Prerequisite: Invertebrate Zoology or equivalent. 4 semester hours. $2,200 tuition; $240 dormitory housing.

Ecology of Tropical Fishes, May 18-June 13

Dr. R. Grant Gilmore (HBOI). Field and laboratory experimental studies of fish ecology and early life histories in freshwater, mangrove and coral reef ecosystems within the Indian River Lagoon and Florida Keys. 5 semester hours, $2,750 tuition; $320 for dormitory housing.

The Indian River Lagoon region contains more species of marine plants and animals than any other estuary in the continental United States

Functional Biology of Marine Invertebrates, June 1-19

Dr. Clay Cook (HBOI). The functional morphology, physiology, behavior and reproduction of marine invertebrates with emphasis on living organisms collected from a variety of habitats in southeast Florida, including coral reefs. Lectures, field trips and laboratory work will use most of the invertebrate phyla to illustrate general principles and themes of invertebrate biology. Relevant research literature will be discussed. 4 semester hours, $2,200 tuition; $240 for dormitory housing.

Transport Processes In Marine Environments, June 1-5

Dr. Ned Smith (HBOI). Designed to serve an interdisciplinary group of advanced undergraduate and graduate students, this short course will examine the transport of dissolved and suspended material by currents and turbulent mixing. Examples and applications will focus on the transport of larvae, pollutants, nutrients and suspended sediments. Emphasis on estuarine and continental shelf waters. Lectures and laboratory exercises supplemented by measurements made on field trips to the Indian River Lagoon. 2 semester hours, $1,100; $80 for dormitory housing.

Global Environmental Problems and Solutions, June 1-19

Dr. Iver Duedall (Florida Institute of Technology). A comprehensive analysis of global environmental problems including human population growth, climate change, ozone depletion, deforestation and desertification. Emphasis will be on the ocean and sustainable development. Students research specific problems and develop potential solutions. 3 semester hours, $1,650; $240 for dormitory housing.

Biology of Tropical Marine Plants, June 22-July 11

Dr. Dennis Hanisak (HBOI). The course will explore the biology of marine plants and the roles they play in tropical and sub-tropical habitats (including coral reefs, coastal lagoons, seagrass beds, mangroves, and

marshes). Following a brief systematic overview, the emphasis will be on ecology and physiology, with a concentration on what roles marine plants have in coastal and marine ecosystems, how marine plants are adapted to their environment, and how they respond to environmental change. Lectures, laboratories, field trips, group discussions, and student presentations. 4 semester hours, $2,200 tuition; $240 for dormitory housing.

"Hands-on" work with living organisms in field and laboratory settings is an important part of our programs

Practical Aquaculture Techniques, July 6-24

Mr. Leroy Creswell (HBOI). Aquaculture systems and processes focusing on the design and operational protocol for aquaculture systems. Topics include system layout and requirements, water sources, pumps and plumbing, re-circulation technology, aeration, disinfection and operational considerations. Students will operate culture systems in the training hatcheries, design an aquaculture facility and outline production protocols for a chosen species. 4 semester hours, $2,200 tuition; $240 for dormitory housing.

Bioluminescence and Vision in the Marine Environment, July 6-17

Drs. Edith Widder, Tamara Frank, Sönke Johnson, (HBOI). Field and laboratory studies of the behavioral, ecological and physiological adaptations associated with bioluminescence and vision in marine animals. Practical work includes observation of bioluminescent organisms, the measurement of light under field and lab conditions and studies of the visual sensitivity of crustaceans. 3 semester hours, $1,650 tuition; $160 for dormitory housing.

Physical Biology of Marine Organisms, July 20-31

Dr. Adele Pile (HBOI) and Dr. Kristina Mead (University of California, Berkeley). Physical Biology of Marine Organisms. The analysis of form, function, and evolution in marine organisms using principles of the physical sciences (fluid and solid mechanics, heat and mass transfer theory). Hands-on laboratory experience with engineering methods, model construction, and measurement techniques appropriate for investigations in physical biology. 3 semester hours, $1,650 tuition; $160 for dormitory housing.

SCHOLARSHIPS

Scholarships are available for qualified applicants on a competitive basis for all courses. Students wishing to be considered for financial aid should indicate this on their applications and provide the financial information requested on the application form. Students who do not need academic credit for transfer to their home institutions will be given a 20% discount. Be sure to check with your faculty advisor, department chair or registrar about your need for credit.

Apply for course admission, scholarship assistance and housing by mailing or faxing the application form in this brochure on or before March 15

ADMISSION

Admissions and scholarship decisions will be made within 3 weeks after all materials are received. Harbor Branch Oceanographic Institution is an equal opportunity /affirmative action institution. Harbor Branch Institution, an affiliate of HBOI, is licensed by the Florida State Board of Independent Colleges and Universities.

HOUSING

Furnished student housing with cooking and laundry facilities is available on a first come, first served basis at $80.00 per person per week. The campus cafeteria serves breakfast and lunch, Monday through Friday.

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PROGRAMS FOR VISITING GROUPS

During the academic year and the early part of the summer, Center laboratory and lecture facilities can be rented by visiting groups who wish to use our complex as a base of operations for short term residential field courses. The daily facilities use fee is $20 per day per student (1998 rates). Boat use, van use and instructional assistance are extra. Faculty can request a rate sheet and a copy of the Center's 'Users Guide' with detailed information on our facilities and field sites. For information on "on-site" workshops for faculty see page 7.

RESEARCH OPPORTUNITIES

From 8 to 15 **RESEARCH INTERNSHIPS** for undergraduate and graduate students are awarded each summer. A limited number of **POSTDOCTORAL FELLOWSHIPS** are available every 18 months for recent Ph.Ds in marine science, aquaculture, biomedical marine research, ocean engineering and environmental analysis and monitoring. Application forms for these programs are available from the Johnson Marine Education Center. The next Postdoctoral Fellowship deadline is April 3, 1998. The Intern Deadline is March 1, 1998.

FACILITIES

HBOI operates 3 research vessels, 3 submersibles and several remotely operated vehicles

Harbor Branch Oceanographic Institution, Inc. was established in 1971 to conduct research in the basic and applied marine sciences and to develop technological tools and engineering systems for oceanographic research. The campus of over 500 acres borders the Indian River Lagoon with access to the Intercoastal Waterway and the Atlantic Ocean through two nearby inlets. The institution operates 3 research vessels, 3 submersibles, several remotely operated vehicles (ROVs) and employs approximately 300 scientists, engineers and support staff.

Facilities at the Johnson Marine Education Center include three teaching laboratories, five lecture/ conference rooms, and a 350 seat auditorium. Laboratories are equipped with dissecting and compound microscopes, standard laboratory equipment such as balances and pH meters, hoods for the safe use of formalin and other chemicals, and aquaria on a recirculating seawater system. Access to field sites is by a 15 passenger van, an inshore pontoon boat and a small trawler. Macintosh and Windows-based computers with Internet access are available for student use.

Students and faculty also routinely use the Harbor Branch Oceanographic Library with 15,000 volumes and 250 journal subscriptions and the Harbor Branch Oceanographic Museum of reference specimens from the region. Course participants and interns routinely interact with staff and graduate students from the HBOI science and engineering divisions.

Student housing consists of several apartment style units with bunk beds (2-4 students per room) and cooking facilities. Linens and kitchen utensils and dishes are provided. Telephones are available in the living units for local calls; long distance calls can be made using a calling card or by calling collect. Coin-operated laundry facilities are available in the residential complex. Campus recreational facilities include a basketball hoop, a volleyball area and a 60 ft.diameter swimming pool. A guard is on duty at the HBOI gate after 5pm and before 8am weekdays and on a 24 hour basis on weekends.

CUT ALONG DOTTED LINE FOR APPLICATION

APPLICATION FORM

Please Print

Date _____

Name _____
Last First Middle

SSN _____ Date of Birth _____

Current Mailing Address _____
Street

_____
City State Zip

Telephone _____ FAX _____ Legal Resident of _____
State or Country

Permanent Address _____
Street

_____
City State Zip

Phone (H) _____ Phone (W) _____ FAX _____

College or university where you are currently a student or teaching if a faculty member

Name _____

Address _____
Street

_____
City State Zip

Department _____ Major _____

Graduate _____ Undergraduate _____
MA / MS / PhD Class (Junior, Senior)

*PLEASE ARRANGE FOR CURRENT UNDERGRADUATE OR GRADUATE TRANSCRIPTS AND A SUPPORTING LETTER FROM YOUR MAJOR ADVISOR OR DEPARTMENT TO BE SENT TO HBOI

Please admit to:

_____ The Biology of Sea Turtles

_____ Ecology of Tropical fishes

_____ Transport Processes in Marine Environ.

_____ Biology of Tropical Marine Plants

_____ Bioluminescence & Vision Mar. Environ.

_____ Reprod. & Larval Ecology of Marine Invertebrates

_____ Functional Biology of Marine Invertebrates

_____ Global Environmental Problems and Solutions

_____ Practical Aquaculture Techniques

_____ Physical Biology of Marine Organisms

_____ Faculty Workshops: May 4-8, June 8-12, June 29-July 2 (please circle your choice)

If a college graduate, list the institution where you received your BS or BA:

College or University _____ Location _____

Dates Attended _____ Degree _____

Do you wish to apply for on-campus dormitory housing? _____ Yes _____ No

Do you wish to receive credit from Florida Institute of Technology? _____ Yes _____ No

Briefly explain why you wish to take this course (or courses). How will our program enrich your academic program or further your career? _____

Financial Information:

Course costs to be paid by: _____ Self or _____ Name of Granting Agency

Do you need financial aid? Yes _____ No _____ . If yes, please provide the following information (All information will be kept confidential)

Sources and total amount of income expected for 1998: _____

Anticipated tuition costs for 1998: _____

Anticipated living expenses for 1998: _____

Estimate of the amount of scholarship assistance you need to attend the Summer Program: _____

Further explanation of need: _____

Mail or fax to:
Susan B. Cook, PhD
Director
J. Seward Johnson Marine Education and Conference Center
Harbor Branch Oceanographic Institution
5600 U.S. 1 North
Ft. Pierce, FL 34946
Phone: 800-333-4264 ext. 500 or 502
FAX: 561-465-5743
Deadline for submitting all application materials: March 15, 1998

Remember to arrange for your transcript and letter of reference

CUT ALONG DOTTED LINE FOR APPLICATION

PROGRAMS FOR FACULTY

FACULTY OUTREACH WORKSHOPS are scheduled for May 4-8, June 8-12 and June 29-July 2, 1998. These workshops give potential leaders of visiting college and graduate level field courses the opportunity to survey our facilities and visit nearby marine and coastal environments. Housing and field trip costs are underwritten by HBOI. Please circle preferred dates on the attached application form. Faculty do not need to send transcripts and reference letters but should submit a curriculum vitae and a brief statement of how the workshop will help in curriculum development and in the design of field programs.

GENERAL INFORMATION

Located on the western shore of the Indian River lagoon in southeastern Florida, the J. Seward Johnson Marine Education and Conference Center is the educational arm of Harbor Branch Oceanographic Institution. The Center is a well equipped teaching facility with classrooms, laboratories and a 350 seat auditorium with sophisticated audio-visual capabilities. The Center offers formal academic coursework in the summer at the undergraduate and graduate level, summer research internships and facilities for visiting field courses throughout the year. Eighteen month long postdoctoral fellowships are awarded periodically for work with Harbor Branch Oceanographic Institution scientists and engineers.

The Center's courses focus primarily on marine biodiversity and the use of technological tools to study the ocean with additional offerings in aquaculture and environmental science. All courses are accredited through the Florida Institute of Technology in Melbourne, Florida.

To apply for 1998 courses, complete the application form in this brochure and mail to us on or before **March 15**. Supporting materials (transcripts and one reference letter) should also be submitted by that date. Late applicants will be accepted on a space available basis.

TRAVEL

The area is served by two international airports (Melbourne and West Palm Beach). With advance notice, limousine service is available from Melbourne and West Palm Beach. Another option is to rent a car at the airport; car rental companies with drop off in Vero Beach include Budget and Hertz, to name a few. Students under 25 years of age may be declined rental or may be charged extra. By car, Harbor Branch is easily reached via I-95 (Indrio Road exit), or U.S. 1. Numerous state parks and public beaches in the area provide opportunities for swimming, fishing, birding, and canoeing. Attractions within easy driving distance of Harbor Branch include Disney World, Kennedy Space Center, Sea World, Epcot Center, and Cypress Gardens.

Numerous state parks and public beaches in the area provide opportunities for swimming, fishing, birding, and canoeing

BEST COPY AVAILABLE

COURSE ENROLLMENT, PAYMENT AND CANCELLATION POLICIES

Students who have been admitted into HBOI programs are required to accept or decline admission and scholarship offers within 15 days of the offer. To hold space in a course, a $50 deposit is required with full course fees due upon arrival at Harbor Branch. If a student cancels 30 or more days before the course start date, the deposit will be refunded. If notice is given after this period, the deposit may be kept as a cancellation fee. Students who wish credit through the Florida Institute of Technology (and are not regular Florida Tech students) will be sent transient student enrollment and course registration forms with the HBOI admission and scholarship decision letter. These forms must be completed and returned to the Johnson Marine Education Center along with the course deposit.

Regular students at Florida Tech register at the Melbourne campus but must also complete a HBOI course application and send it to the Harbor Branch Education Office. Supporting documents (transcripts and recommendation letters) are not required.

1998 SUMMER COURSE FACULTY

Clayton Cook, *Senior Scientist, Harbor Branch Oceanographic Institution. [illegible], Duke University*

LeRoy Creswell, *Research Associate, Harbor Branch Oceanographic Institution, M.S., University of Miami*

Iver Duedall, Professor, *Florida Institute of Technology, Ph.D., Dalhousie University*

Tamara Frank, *Assistant Scientist, Harbor Branch Oceanographic Institution, Ph.D., University of California, Santa Barbara*

R. Grant Gilmore, *Senior Scientist, Harbor Branch Oceanographic Institution, Ph.D., Florida Institute of Technology*

Dennis Hanisak, *Senior Scientist, Harbor Branch Oceanographic Institution, Ph.D., University of Rhode Island*

Sonke Johnson, *Postdoctoral Fellow, Harbor Branch Institution, Ph.D., University of North Carolina at Chapel Hill*

Kristina Mead, *Postdoctoral Fellow, University of California at Berkeley, Ph.D., Stanford University*

Adele Pile, *Postdoctoral Fellow, Harbor Branch Institution, Ph.D., College of William & Mary*

Ned Smith, *Senior Scientist, Harbor Branch Oceanographic Institution, Ph.D., University of Wisconsin*

Edith Widder, *Senior Scientist, Harbor Branch Oceanographic Institution, Ph.D., University of California, Santa Barbara*

Jeanette Wyneken, *Adjunct Assistant Professor, Florida Atlantic University, Ph.D., University of Illinois*

Craig Young, *Senior Scientist, Harbor Branch Oceanographic Institution, Ph.D., University of Alberta*

SCHOLARSHIPS ARE AVAILABLE. See page 3 for details.